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THE MAGAZINE FOR INFORMATION EXECUTIVES

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Is your infrastructure
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to planning and selling
IT investments

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ALSO INSIDE

How Will
Push Technology
Affect You?

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Thiokol's
Brad Stout
takes a radical
approach

Bosphorus Bridge, Istanbul



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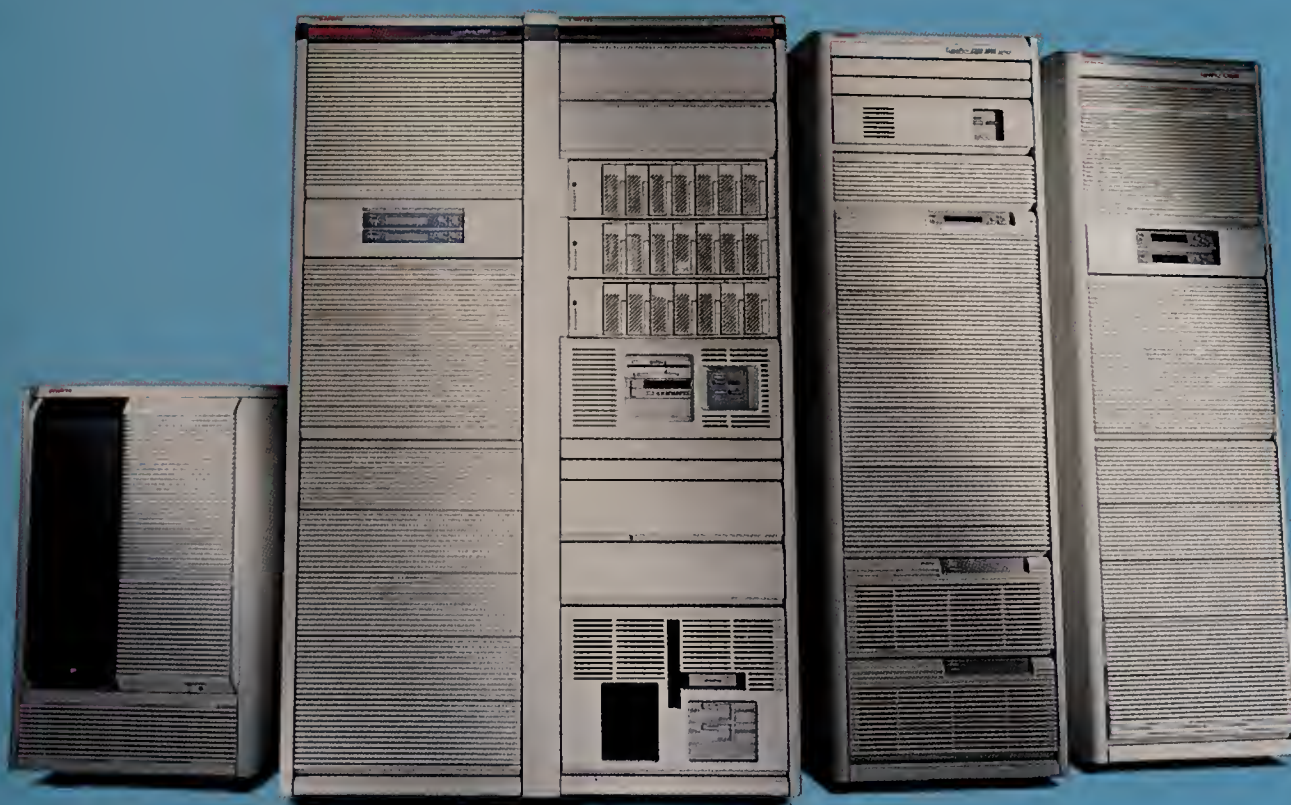
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Inside CIO

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CIO Brad Stout shoulders the burden of completely overhauling Thiokol Corp.'s infrastructure.
Cover photo by Kent Hanson

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Products and services from CIO Communications Inc.

■ Surveys Maximizing the Internet, Managing IT Standards, Executive Compensation

■ Next Conference "A Tale of Two Webs: Making Your Intranet and the Internet Pay Off," May 18-21, at the Doral Golf Resort & Spa, Miami

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With a vision for the Internet and the trust of thousands on the line, DIGEX needed a company that provided a lot more than just hardware.

Very simply, the people at DIGEXSM bet the farm on Compaq running Windows NT[®]—a combination that is changing the way we do business on the Internet forever. Two years ago DIGEX was a small regional Internet Service Provider. Today they are a national Internet carrier and the world's largest web site management facility based on Microsoft NT.

Providing industrial-strength Internet hosting services, DIGEX is home to many of the most popular and innovative web sites today, including Bombay Company, Allstate Insurance, Ernst & Young and Net Grocer. By going beyond the RISC/UNIX alternative and partnering with Compaq, they made doing business on the Internet a much

easier and more accessible undertaking for thousands of businesses.

Compaq was chosen to be the exclusive NT platform to power this business because the people at DIGEX needed a company that provided a lot more than servers. Even the most powerful, manageable and reliable servers. DIGEX needed the best proven solutions to implement, manage and grow with NT web hosting. With state-of-the-art systems management and continuous service and support, Compaq provides exactly that. And Compaq's alliance with Microsoft makes certain DIGEX is running the most robust and open platform for the Internet. This is how DIGEX's vision became a reality.



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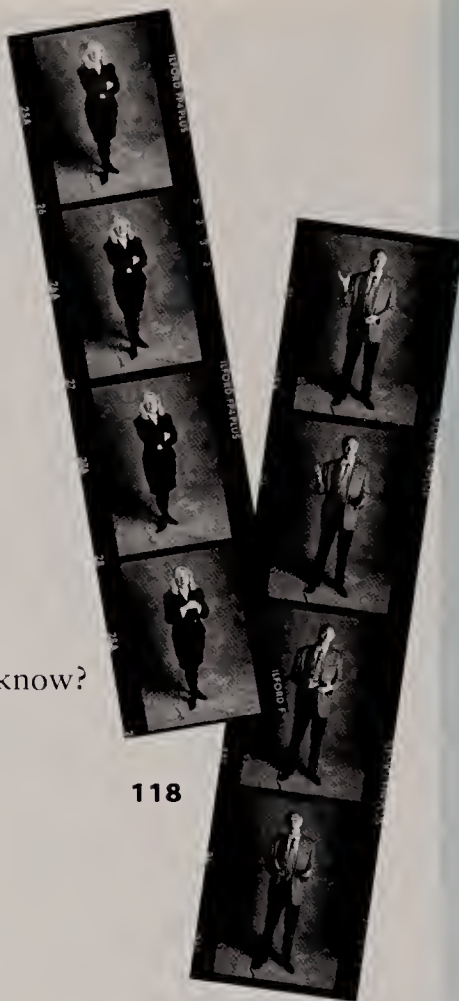
■ Digital cameras, digital document servers, thin monitors, theft recovery software

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A CIM system centralized processing for this Florida company charged with managing the state's prison industries.

By Heath Row



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EXCEPTIONAL EXCERPTS

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www.cio.com/CIO/0397_perspectives.html

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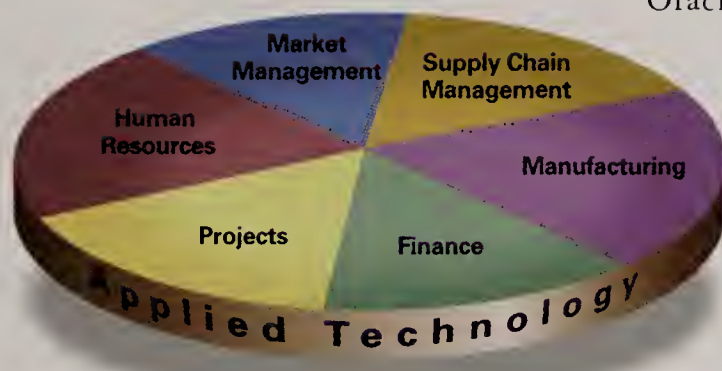
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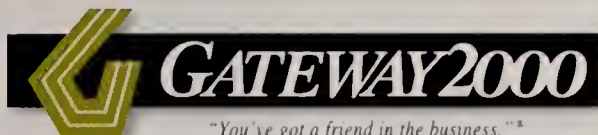
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Product of the Year IS Manager's Choice Award for the P5-200XL desktop PC in the February 1997 issue of *Datamation*.

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In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

"The kiss of death is reporting to the CFO."

Do you agree with that statement? It was made by a CIO whose experience—like that of many other IS executives—has shown that finance officers are concerned first and foremost with controlling costs, even at the expense of advancing important business goals. The CIO charter is to know the business and its information needs and then apply an understanding of technology to create a new and better way of doing things. Sometimes that requires making choices that don't necessarily cost less.



Another CIO I know says reporting to the CFO (hers, anyway) works great. In fact, he's one of her chief supporters. He's in tune with the CEO's vision and the plan for getting there, and when the CIO needs backup, she knows he's in her corner.

Maybe the problem is not so much with the position as it is with the approach many people take to it. "The worst managed part of the business is not people; it's money," says Peter F. Drucker, Clarke professor of social science and management at the Claremont Graduate School. That is because most finance officers grew up in accounting and don't know the first thing about managing money, he said at a recent CIO Perspectives conference.

Tomorrow's businesses will be built on information. But for that to happen, the "oldest information system in the world"—accounting—must be merged with the new, says Drucker.

That suggests a few things to me. First, Drucker's complaint about finance executives' penchant for accounting sounds a lot like the complaints about IS executives' fondness for technology. And if, indeed, there is to be a merger, each group must shift its focus to what really matters: the information that will drive the business.

Do you report to the CFO or the CEO? How does that influence how you do your job and your ability to be effective? Share your experience with other readers by sending e-mail to letters@cio.com. We'll take anonymous submissions for this one—just let us know.

Alki Lundberg
lundberg@cio.com

FROM OUR READERS

CULTURE CHANGE

I'm a Japanese information services manager working in Tokyo for a U.S. company, United Technologies Corp. One of my colleagues sent me your article "Haiku, Cherry Blossoms, Sushi and...Notes?" [Nov. 15, 1996].

I completely agree with you that the Japanese are not willing to use computer or digital networks. I know because every day I encourage Japanese employees to use our intranet produced by U.S. headquarters. But they are not interested in it very much because of the language problem. I know the cooperative information environment in America well—before I came to UTC, I had worked for the McKinsey Tokyo office,

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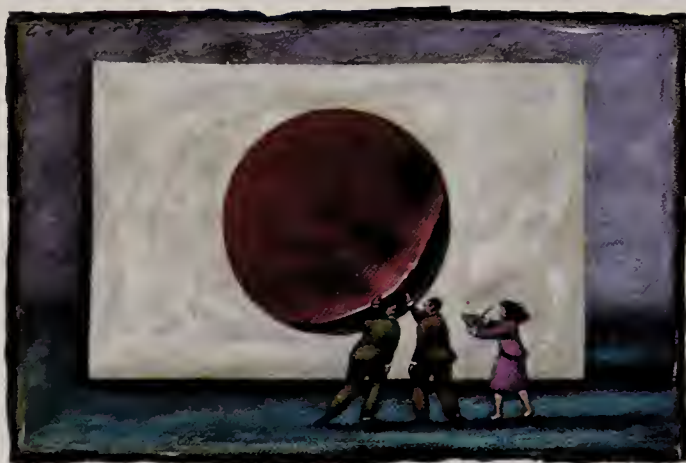
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which has had a U.S. culture for years. So the difference surprised me when I started to work with our Japanese UTC subsidiaries. As you wrote, "Japanese companies have a great appreciation for knowledge and information but not for using IT to create and share it."

I think a major reason for that is the trouble with keyboard typing in Japanese. Even aside from the kanji character problem, using a keyboard is still a barrier to us.

But I think the culture is changing. I know some Japanese who are beginning to read long e-mails onscreen rather than print them. As of November 1996, 73 percent of all computers in publicly held companies in Japan were connected to networks.

If you read *Nikkei Jobo Strategy* [a Japanese business publication], you would find many samples of the IT revolution in major Japanese companies. In most cases, the reason for getting e-mail, Notes and telecommuting is to catch up with U.S. competitors, not to increase productivity. In this country, we spend a

lot of time playing catch-up with the United States. So I'm positive there will be a change in the IT culture here in the future.

I don't know of a better written article in English than yours concerning this situation; some U.S. writers don't seem to get the point. But thanks to you, I don't have to explain Japan's IT situation in my terrible English; I need only send a copy of your article to my U.S. friends.

Mami Kobayashi

Manager

UTC Information Network

Tokyo

nkobaya@shinjuku.otis.utc.com

A FORUM OF IDEAS

I e-mailed you a few months ago about the topic of process versus technology change. You recommended I post it as a topic on the CIO Connection online forum (www.cio.com/forums). I just wanted to say thanks for your advice and give you an update on the general consensus of the responses.

I posted the following request:

"An issue I am dealing with concerns management and users of the plant I work at and how they deal with and react to IT projects. We are currently in the process of implementing a maintenance management system and are about to do the same for a large-scale MRP project in the upcoming year. Both projects are being implemented companywide and are supported by corporate management, but plant managers at the manufacturing level are having a tough time embracing and supporting them. Each week, I am confronted by managers or end users who want to know only the bare minimum of what they need to learn to use the system. The main issue that I see is that they are concerned with only how they are impacted by the technology change to the system, such as the electronic version of a paper form they filled out in the old process, and they have no real time or commitment for how they will be affected by the process change that the system will bring.

"I was wondering if anyone could help me locate sources of information

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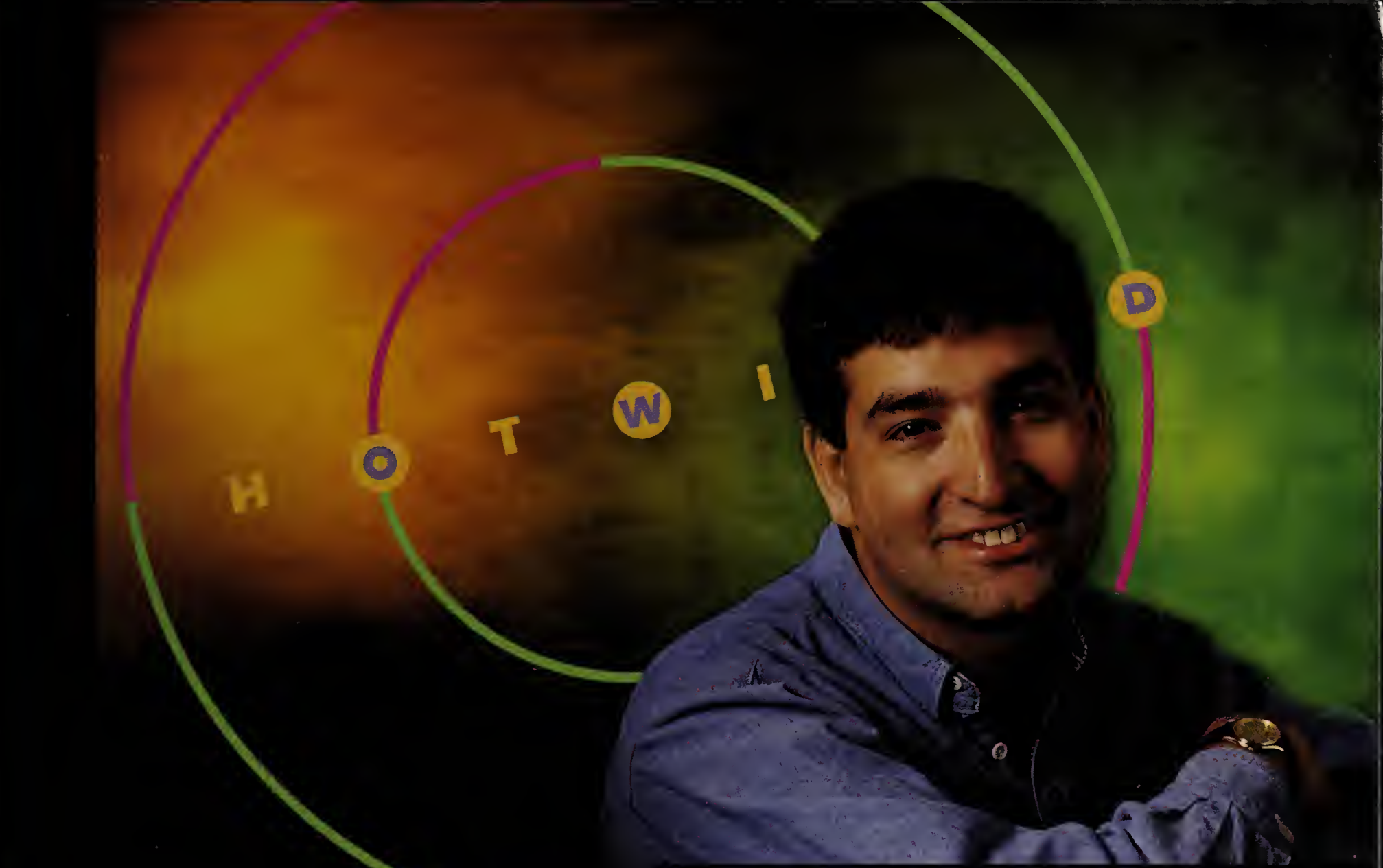
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for a paper I am writing to explain how important it is to recognize and embrace the process changes as well as the technology changes that those new systems will bring to our business processes. The paper will be used to explain to plant management the importance of process changes and to enlist their support for these two major projects. It will also be used by the training department."

The responses I received focused on the following:

Management Commitment: This was the most common and strongly emphasized comment. High-level management commitment must be visible and expressed often.

Training: In-depth training on the technology and the process must be given before and during the implementation of a project. Training should be done in small groups or in one-on-one sessions. Also, identify and communi-

cate to all levels the consequences of nonconformance to the training plan upfront.

User Involvement: From the beginning, make users believe that they are a part of the project and have input into what eventually is delivered. Make sure to identify WIIFT (what's in it for them). A sense of ownership can go a long way when startup issues arise, and they always do.

Communication: Do everything short of hire a PR firm to help the implementation succeed. Clearly identify the impact on everyone and communicate it months in advance, not weeks or days. Visits to sites that already are using the proposed new technology and processes help prepare the users for what is coming.

Paul Maggio

MIS Manager

Air Products & Chemicals

Calvert City, Ky.

maggiopv@apci.com



LEADING CHANGE

I enjoyed Carol Hildebrand's March 15 article "Inside and Out." [The article noted that managing change can be done by simply honing internal processes, but those organizations that "lead" change



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will be the most successful. After all, a company that's serious about transformation needs a person, not a revamped process.]

It was very well timed for my company. We recently drafted a vision statement. Change has been fairly awkward for most of our staff. After reading your article, I confirmed to myself that I am not crazy to be thinking this way (like Peter Drucker and Stan Davis).

Keep up the good work.

Robert F. Schuler

Director of IT, North America
LEK/Alcar Consulting Group LLC
Chicago
rfs@lekalcar.com

INSIGHTFUL READING

I just finished reading Carol Hildebrand's "Inside and Out" and was struck by the obvious truth of the main premise—or at least what I took to be the main premise. Leadership is indeed

something different from management. And while every company I have ever worked for has spent millions on managing process, it has not once had a substantial effect on either morale or productivity.

In my personal experience, productive people appear to maintain productivity through organizational change, whereas disillusioned and uninvolved employees tend only to become worse. Thoughtful and creative leadership is the one catalyst for positive change that I have witnessed.

Before reading your article, I had not heard of either Warren Bennis or the Leadership Institute at USC. Do you know whether Mr. Bennis, or anyone else, has published any worthwhile books on the topic? I have trudged through a few of the typical leadership/motivational bestsellers and would welcome something that is more scholarly than evangelical.

Thanks again for an interesting and insightful article.

Jerry Nelson

Team Leader
Global Data Warehouse Group
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Beaverton, Ore.
Jerry.Nelson@nike.com

Mr. Bennis serves on the editorial board of Behavior OnLine Inc. (www.behavior.net), which offers the following biographical information:

Warren Bennis, PhD, is university professor and distinguished professor of business administration at the University of Southern California and the founding chairman of USC's Leadership Institute. He has written numerous books including: *On Becoming a Leader* (which was translated into many languages), *Why Leaders Can't Lead* and *The Unreality Industry & Leaders*, co-written with Ian Mitroff.

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Publisher's Note

There's a new technology on the horizon. It's dynamic, interactive and customized. And it goes by the name of "push."

Now's the time to bone up on the subject because it's going to change the way companies do business. And if you're not thinking seriously about push applications, I'll bet your competitors are. The case studies featured in Contributing Writer Lynda Radosevich's "Pushing It," Page 58, make it crystal clear that involvement of the CIO is critical to the technology's success. Both the technical and business issues of push require the knowledge and experience of senior IS executives.



The return on investment from push technology can be enormous, but the risks need to be addressed. Issues such as content relevance, clogged firewalls and security breaches from pushed executable codes must be weighed against the benefits of real-time information delivery and software application deployment. If your business is customer service-centric, push technology can be a great differentiator between you and your competition. First Union National Bank in Charlotte, N.C., is living proof that push can give you

competitive advantage. The bank is using push software to give its analysts the news they need, such as information about system outages or slow response times. By having that information at their desktops in real-time, analysts are better prepared to support their online banking customers.

If Netscape Communications Corp. and Microsoft Corp. are the barometers of the Internet industry, you can be sure that push is the next big thing. Both companies are battling to be the first to release software with push technologies built into their Web browsers. And companies such as PointCast Inc., Marimba Inc. and Intermind Corp. are making big splashes and attracting some of the largest crowds at Internet-related trade shows. Now is the time for IS and business executives to consider proactively the pros and cons of push. Wouldn't it be nice to be ahead of the paradigm this time?

A handwritten signature in black ink that reads "Joseph L. Levy".

P.S. Join Geoffrey Moore, Nicholas Negroponte and Dr. Ruth Westheimer at the next WebMaster Perspectives conference. "A Tale of Two Webs: Making Your Intranet and Internet Pay Off" will be held May 18-21 at the Doral Golf Resort & Spa in Miami. It's not too late to register. Call 800 355-0246 or visit www.web-master.com to register.

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NEWS, INSIGHT, HUMOR

Edited by Alice Dragoon

Recipe for an IT Test Kitchen

CIO LAB When temperatures plunge and the wind whips off Lake Michigan, the thoughts of Chicagoans trudging to work naturally may turn to jobs in more temperate locales. But CIOs who endure endless months of lake-effect snow now have something their counterparts in other areas of the country don't—a place where they can get hot coffee, collaborate with peers and try the latest and greatest computer hardware, software and networking tools.

The Chicago Research & Planning Group's (CRPG's) Training and Technology Center (TTC) in Mount Prospect, Ill., contains a wide range of computer equipment that IS professionals can use to simulate and duplicate operating environments in which

to evaluate products. The center can also be used to solve operations, interoperability, network and productivity problems. Open only to CRPG member companies, the TTC is updated regularly with new equipment and software to accommodate member needs. "Nobody could afford to set up a lab this complex, but everybody needs it to test new operating systems," explains Mason Rotelli, senior vice president of information services at Skokie, Ill.-based Anixter Inc., a networking equipment vendor that donated building space and

network tools to the TTC. "In addition to the preliminary costs of setting up a lab, you'd have to spend 50 percent



The Tao of Goo

I.T. IN THE CRADLE For the typical child, it's a plaything. For the disabled child, it opens a new, critical line of communication. The Baby Babble Blanket, brainchild of two Northeastern University professors, builds on the technology of musical greeting cards to allow infants to play digital recordings. By twitching a muscle atop a specially wired blanket, babies activate supportive messages recorded by their parents. Designed for babies who cannot wave an arm or kick a leg to elicit parental coos, the Baby Babble Blanket can also help any child develop understanding of cause-and-effect and motor movement skills.

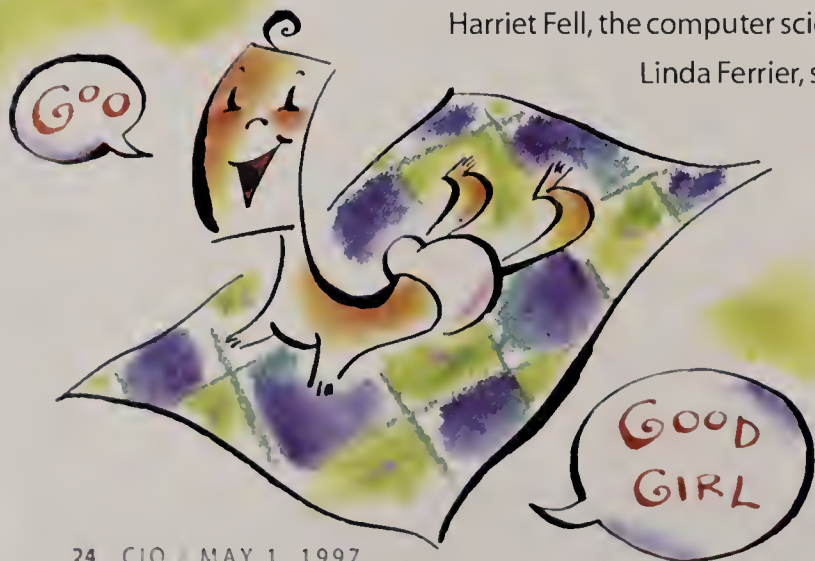
The blanket is wired with a grid of 12 pressure-sensitive micro-switches fed into a small switchbox in which a parent can record encouraging words, music or any other pleasant sound. By moving even slightly on one of the switches—say, by flexing a neck or buttock muscle—the infant triggers the recorded response.

Harriet Fell, the computer scientist who developed the Baby Babble Blanket with speech pathologist

Linda Ferrier, says it tested successfully with several disabled children. One five-month-

old boy with poor muscle tone, club feet and hydrocephalus became more active when he learned he could roll over and hear his mother's encouraging voice. Another infant, who communicated mainly by screaming, became more at ease when he discovered how to trigger the sound of his dad's voice.

The blanket will be released as Sound Explorer later this year by Meeting the Challenge Inc. of Colorado Springs, Colo., for about \$350. For more information, contact the company at 719 444-0252. ■





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Trendlines

more every year to keep up with all the changes," he adds. "So this is an incredible way to save money and share ideas with other CRPG members."

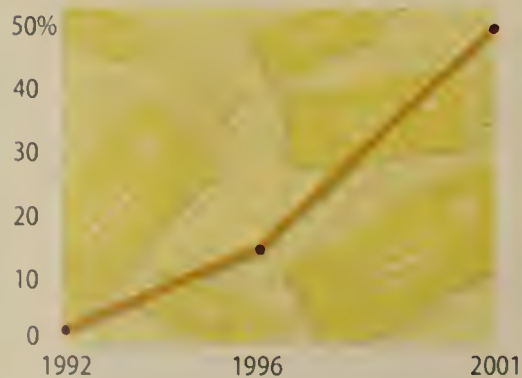
IBM Corp.'s Call Center Solutions division in Rolling Meadows, Ill., is taking advantage of the TTC to test new releases of its computer telephony technology against different types of switches. Using the center—which costs about \$1,500 a day—is far cheaper than buying the equipment outright, says Rich Stima, IBM application developer analyst. "You really can't test a new release unless you hook it to a real switch," he says. "But for the little bit of testing we do, it's not worth \$150,000 to buy the switch."

Each member company using the TTC sets confidentiality parameters for its own experiments. But part of the appeal of the center is that it brings members together to share ideas, thereby reducing technology implementation risks, says Rotelli. To foster such exchanges, the CRPG sponsors seminars at the TTC on such topics as building an intranet.

"The center is the most wonderful place," says Stima. "They are so helpful, and when I say helpful, I mean everything from having a spare parallel-port Zip drive to hot chocolate. You want coffee? Your chair isn't comfortable? You have a grungy monitor? They take care of it all; no disturbances, no lines, no pressure." CIOs who live near the Windy City can call the CRPG at 312 609-6500 for more information. —Jennifer Bresnahan

The E-Mail Habit

Percentage of U.S. population that uses e-mail



SOURCE: FORRESTER RESEARCH INC., 1996

Anywhere Computing

PAY-PER-USE PCs

Sick of balancing a cup of coffee in one hand while attaching your laptop to an airport pay phone to check the boss's latest e-mail missives with the other? Keeping tabs on electronic communiqués from the home office while traveling can be as easy as sliding a credit card through a card reader connected to a computer kiosk system, now that pay-per-use computing is spreading beyond cybercafes.

Because business travelers who'd rather not lug a laptop represent a likely target for pay-per-use computing, it's no surprise that such services are finding their way into hotel rooms, convention centers and airports. At the Dallas-Fort Worth International Airport, for example, more than 800 users spend 33 cents per minute to log into the airport's 20 Atcom/Info Inc.-installed computer screens each day to connect to the Net. And USA Technologies Inc. of Wayne, Pa., takes business-travel convenience one step further. In addition to offering PC Express (PCs and printers rigged for pay-per-use computing), the company markets a Business Express self-service office cube equipped with an Internet-connected computer, fax and photocopy machines, and a laptop printer. The entire mini-office is activated with the swipe of a credit card, and the system prints an itemized receipt at the end of the work session. Most entrepreneurs who purchase or lease the equipment from USA charge users from \$9 to \$12 an hour.

But there are signs that the market for such services may extend well beyond business travelers. Although many public and university libraries already offer some Internet-connected PCs funded by government subsidies, libraries such as those at Boston College and Princeton University and the San Francisco Public Library are offering pay-per-use facilities to help them recover the cost of expanding Internet access. What's more, retailers hoping to cash in on customers' computing needs are installing automated pay-per-use computing systems in such places as a Borders Books and Music store in Wilmington, Del.; a West Coast Video store in Huntington Valley, Pa.; and a Union 76 truck stop in Ontario, Calif.

"We weren't aware of it at first, but truckers need the Net to plan their routes and stops," says Neil Senturia, CEO of San Diego-based Atcom/Info, whose network links the truck stop to the Net. Truckers check weather reports and their bookings and communicate with the home office via the Internet. Such practical uses of online communication are the key to pay-per-use computing's success, Senturia says. "Connecting to the Net and surfing is fun but not compelling," he says. "E-mail is the killer app." —Peter Fabris



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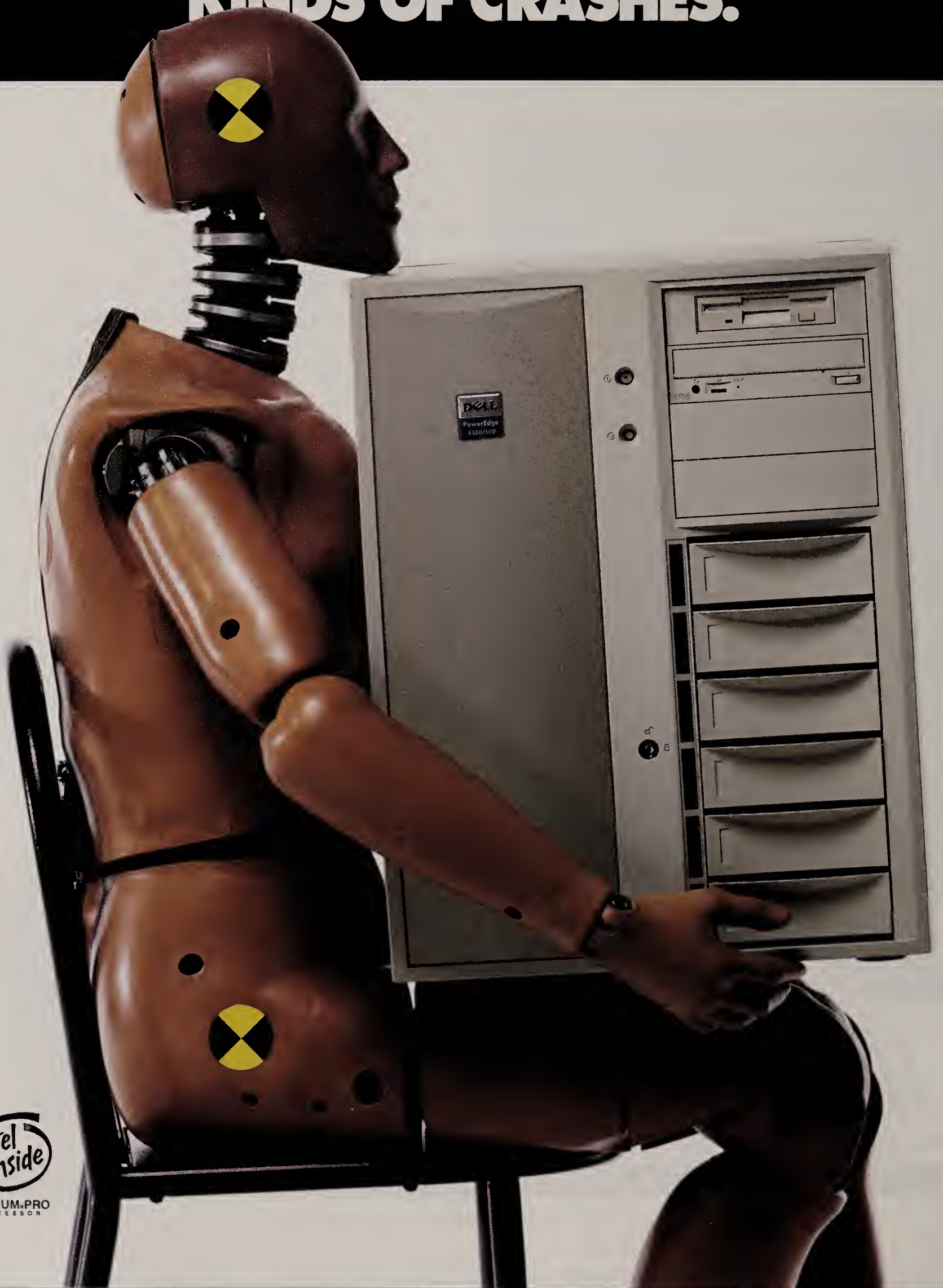
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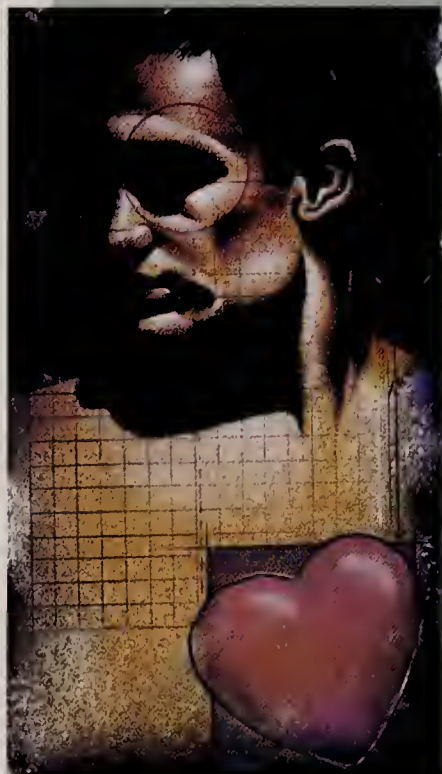
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Trendlines

Every Breath You Take

THEY'LL BE WATCHING YOU Had television's Lt. Gerard been privy to this technology, Dr. Kimble might not have remained the Fugitive for so many years. Today, if a real-life fugitive were to leap into a half-full garbage truck and remain perfectly still,



the beating of his telltale heart would give him away to the enclosed space detection system developed by the Department of Energy's Oak Ridge National Laboratory in Oak Ridge, Tenn.

The system uses either sensitive seismic geophones or microwaves to detect the unique pattern of shockwaves created by a beating heart; data analysis algorithms enhance the system's effectiveness and accuracy. Although the DOE developed the

system as part of its Portal of the Future effort to prevent terrorists or other intruders from sneaking onto the DOE's properties—some of which have supported nuclear weapons production—the system also could be used to help catch prisoners escaping from jail or illegal aliens attempting to cross borders.

As part of the Portal of the Future project, researchers at the Oak Ridge facility are also developing a fiber-optic weigh-in-motion system that allows operators to weigh moving vehicles (up to 5 mph) entering and leaving a secure area; an under-vehicle scanning system that lets operators scan underneath moving vehicles; and explosives detection systems that either detect vapors and particles emitted by explosive compounds or bombard targets with neutrons and examine the resulting gamma-ray signatures for evidence of such explosive components as oxygen, nitrogen and carbon.

Although those technologies have not been tested together, elements have been tried out in maximum security prisons in California and Tennessee, says Ron Walli, an Oak Ridge National Laboratory public affairs official. Leo Labaj, Portal project manager, says a new test bed is being constructed at the DOE's Y-12 facility in Oak Ridge. Independent operational tests will be conducted on each system before they will be integrated to operate as one. ■

Fame and Fortune

CELEBRITY STOCK EXCHANGE Kids, do try this at home.

The Rogue Market (www.roguemarket.com), an interactive, Web-based game from Digital Market Productions of New York, allows Internet users to buy, sell and trade "shares" of the world's biggest celebrities—from Michael Jordan to Michael Caine. Based in principle and design on the real stock market, Rogue Market's celebrity shares rise and fall with the popularity of more than 800 celebrities in 30-plus categories. Winners—those who accrue at least 17,000 points—are eligible to receive free hats and T-shirts.



"It doesn't take long for people to get into it," says William Fisher, an executive producer of Rogue Market, who estimates the game has attracted 8,000 regular traders since it was introduced in January 1997. "A lot of people are a little intimidated by the regular stock market," Fisher says. "The main thing with Rogue Market is do you know your celebrities, can you anticipate trends and can you ride them until they're done?"

To play, Rogue Market traders register at the free site and immediately are awarded an initial portfolio of 10,000 points,

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Microsoft Exchange Server its "Editor's Choice." Further proof that Microsoft Exchange Server is the best messaging and collaboration system available today—the recent Burke Marketing Research study. It concluded that 70% of IT Administrators prefer Microsoft Exchange Server over Lotus Domino and Netscape Mail Server.

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Trendlines

which they may invest as they see fit, choosing among celebrities whose "prices" reflect their current popularity, which is gauged and valued by Rogue Market's other traders. Radio talk show host Howard Stern, for instance, riding the wave of his movie *Private Parts*, recently led the Talk Radio category with a value of \$57.95, while his rival Don Imus, hawking only a picture book co-authored with his brother, was a distant second at \$23.81.

To aid traders, Rogue Market's Web site includes a Rumor Mill that dishes up celebrity gossip, market statistics and even a "Rogue Market Journal" that offers humorous albeit bogus celebrity news accounts. Traders are encouraged to profile themselves in a Rogues Gallery.

Although Rogue Market is purely for fun, Fisher hopes to make money by attracting advertisers to the site and by licensing the concept to users who want to create smaller, regional Rogue Markets featuring local personalities. ■

"The ability to use multimedia will emerge as a life skill in the 21st century. Citizens who do not know how to use multimedia will become disenfranchised. Cut off from the information superhighway, they will end up watching life go by instead of living it fully."

—FROM MULTIMEDIA LITERACY BY FRED T. HOFSTETTER (MCGRAW-HILL, 1997)

Off the Shelf

Brains and Talent

**Intellectual Capital:
The New Wealth of Organizations**
By Tom Stewart, Doubleday,
1997, \$27

ONE HEARS MUCH TALK THESE DAYS about the importance of corporate knowledge in the information age, but what really does that mean? And how will we know when that much-discussed age arrives?

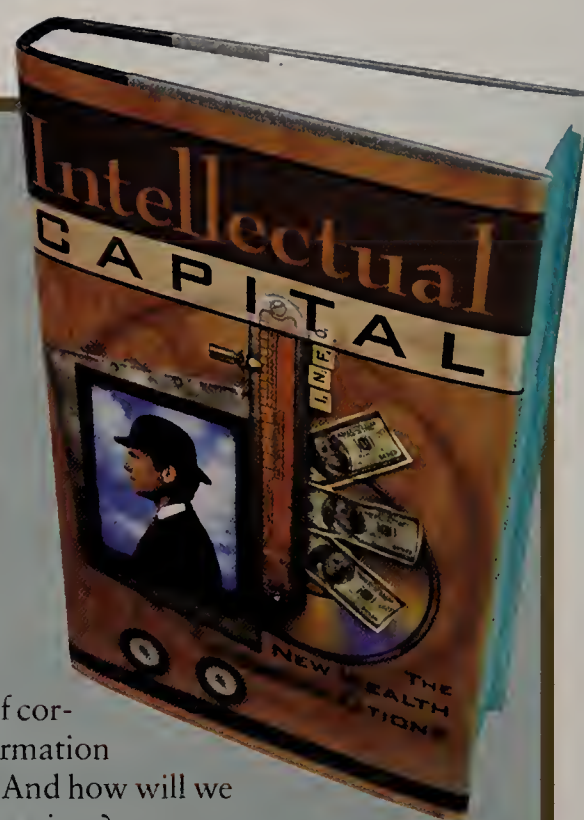
One way might be to ask Tom Stewart, a member of *Fortune* magazine's board of editors who has been reporting on the increasing importance of information to the corporate world since 1989. One of the first to use the phrase "intellectual capital," Stewart has written a book on the subject. *Intellectual Capital: The New Wealth of Organizations* tracks the emergence of a knowledge-based economy and explains why companies need to change their focus to fully capitalize on the wealth of knowledge that lurks in the craniums and databases of any company.

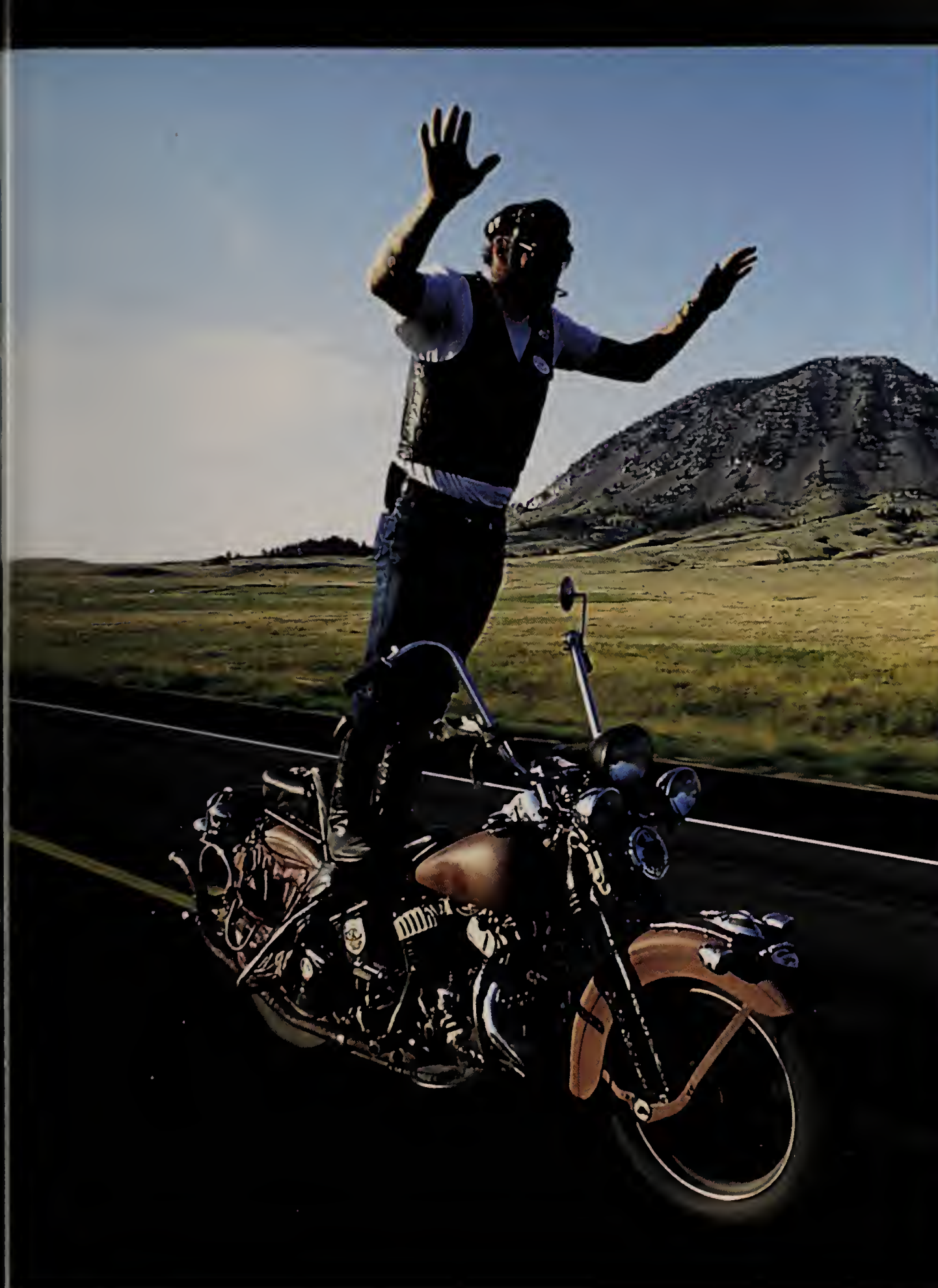
Stewart pinpoints 1991 as the dawn of the information age because that was the first year corporate capital spending on traditional Industrial Age goods such as engines, turbines and mining equipment was surpassed by spending on information machines. (Yes, you guessed it: computers and telecom gear.) Industrial spending has held steady at around \$110 billion yearly since 1982. But, writes Stewart, "capital spending for information machines has ballooned.... Plotted on a graph, the two lines—Industrial Age and information age capital spending—cross in 1991. That year, spending for production technology was \$107 billion and information technology spending was \$112 billion. Call that year one of the information age. Ever since, companies have spent more money on equipment that gathers, processes, analyzes and distributes information than on machines that stamp, cut, assemble, lift and otherwise manipulate the physical world."

Clearly, companies spending that much money on equipment that contributes to thinking will sooner or later realize they need to understand how knowledge workers process, store and work with information.

But how do you do it? Stewart offers a blend of big-picture historical analysis of the forces that have led some companies to spend serious time and money at this "knowledge management business" and practical advice drawn from case studies of some of the early adventurers in that field. Hughes International, General Electric Co., Skandia Insurance Co. Ltd.—those are just a few of the companies that have started managing knowledge as if it were the critical success factor of the future that Stewart believes it is.

He's in good company, too. The SEC held a conference in April 1996, "Financial Accounting and Intangible Assets." If the SEC is paying attention, you can bet your company should be. Written in uncommonly lucid prose, Stewart's book will help you understand why. —Carol Hildebrand





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Trendlines

SNEAK PREVIEW

I.S. LEADERS

Paul Strassmann is one of the 12 most influential IS leaders of The CIO Decade. To learn who the others are, see CIO's 10th Anniversary issue, coming Sept. 15.

"If there's any myopia we have suffered, it's overemphasis on the costs of the tangible technology. When we started out, hardware was everything; but in the last 10 years, hardware costs almost don't matter. The assets are in the knowledge capital—the training of people, the organization or how you put it together, and the data. The CIOs in this world are not going to make it if they just look at the hardware and technology costs. That's boiler room now."

—Paul Strassmann, former CIO of Xerox Corp. and the Department of Defense and current president of Information Economics Press

Where Were You 10 Years Ago?

THE CIO DECADE

READER SNAPSHOT

IN SEPTEMBER, we'll celebrate the 10th anniversary of CIO. In the months leading up to our 10th Anniversary issue, we'll be asking readers to look back and tell us where they were in 1987 and how they ended up where they are today. The CIO's job is a tough one; those who've succeeded over the past decade can recount enough war stories to fill a textbook. We invite you to tell us your story when you visit our Web site at www.cio.com/snapshots/.



Albert Aiello Jr.

Managing Director, Fidelity Investments, Boston

Career Moves, 1987-97: Two companies, three positions

Years Reading CIO: 10

10 Years Ago: Director of information services at First Boston, where he introduced a new architecture—PCs, servers and mainframes—for a trading system.

Moment of "Arrival" as CIO: "There was no pivotal event but a gradual realization and recognition of the impact I'd had on the business. You've provided the building blocks, then one day you look back and see that you've built a house."

Lessons Learned: "To be a successful CIO takes leadership, vision and creativity. It requires the ability not just to extend the lines that are already in place but to take the dots and draw a new picture on them. Ten years ago, those skills were less important compared with the emphasis on delivery of systems and operational capabilities. The latter still needs to be done today, but the CIO's value is not in that. In fact, these responsibilities and skills may not even need to be together in the same position anymore."

Biggest Change During Career: "Thirty years ago, IT was transactional, then it became strategic and embedded, and now it is the product itself, with personification in the World Wide Web."

Next Move: "I'm retiring from Fidelity at the end of this year, but there's always something else to do, a new way to have fun. It may not be with a for-profit company; I may do something in community service."

—Richard Pastore

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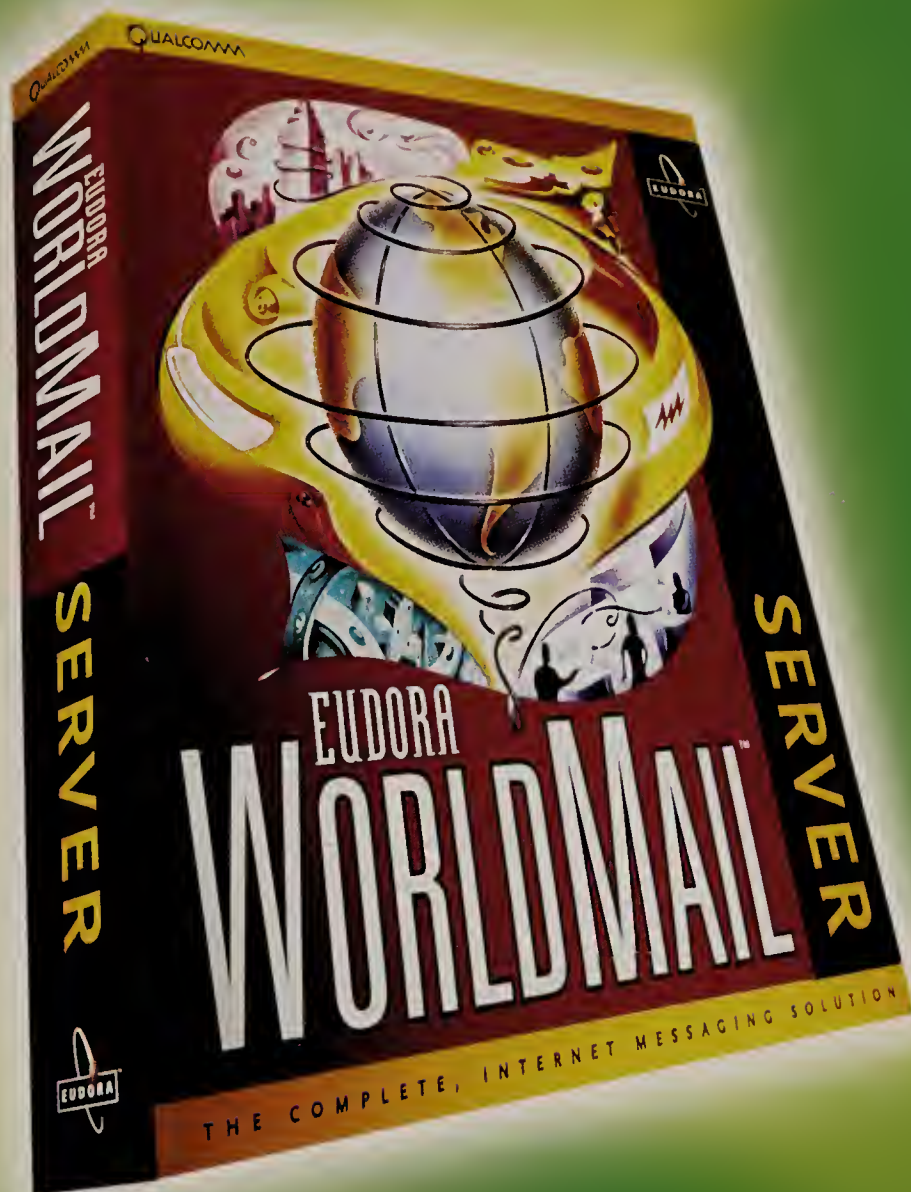
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Change Agent *By Carol Hildebrand*

TRANSFORMING PEOPLE, PROCESSES AND ATTITUDES

The Greenhouse Effect

Change is inherently messy. Isolating that messiness in a protected environment gives employees the freedom to experiment with new processes—and the opportunity to learn from mistakes without affecting the bottom line.

CHANGE-INDUCED CORPORATE turmoil is certainly painful, but it's equally inescapable. It's kind of like spring cleaning: If you're really cleaning (not just tidying) a room, it will get a lot messier before reaching its final, pristine state. Chairs get shoved around. Magazine stacks teeter in the corner, waiting to hit the dustbin. In fact, many experts say that such transformations inherently beget untidiness. It's unsightly but necessary. Same with business change.

All this may sound logical in the abstract. But when change-induced messiness lands in the middle of your career, logic is apt to give way to panic. Then the urge is to fix things fast.

Most corporations seek to discipline change—be it functional or technical—by channeling the whole unruly mess through a structured methodology of some sort. Frankly, the impulse is understandable. After all, a linear and structured process will look much better on a PowerPoint slide than an amorphous cloud shape

marked “change.” A project manager can explain a methodology in detail; it's much better than pointing to the change cloud and saying airily, “Well, this is where the whole thing gets very messy: Users get annoyed, the new processes break down and we get downhearted.”

But imposing structure on change is tricky. Too much of that rules-based stuff can squash vital creative chaos like an overripe berry. And to add another element to the mix, change-management planners must propagate those new processes and ideas in corporate climates that are sometimes downright hostile. The trick is to design a structural framework that contains ample space to experiment with and learn from new ideas and processes, and somehow build it so that the fledgling change project can grow to maturity unharmed.

Greener Paths to Change

One such framework is the brainchild of the folks at Symmetrix Inc., a management consulting firm in Lexington, Mass. Called a greenhouse, it can help minimize the risks involved in process change, says company President Don Hawley. The basic idea is to assemble a core greenhouse team that will take whatever you want to change, be it one department or a process that cuts across four different functions, and spend several months analyzing the problem and redesigning the environment. Then, rather than trying to implement the new ideas in a department entrenched in old



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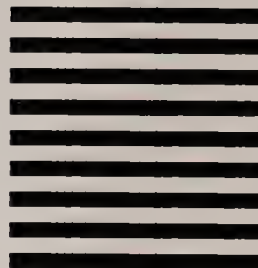
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Change Agent

methods, a greenhouse project involves moving the change team to a separate physical environment, giving team members some real live clients to work with and letting them have at it.

"It's as close as you can get to taking a small piece of the business and spinning it off as a separate P&L," says Hawley. By keeping the greenhouse away from the rest of the corporation, participants are removed from old-line assumptions and biases. And if greenhouse workers can show measurable benefits from their labors, the rest of the corporation may be more willing to accept the change.

How does it work in practice? Watson Wyatt Worldwide (WW), a human resources benefits consultancy based in Washington with 89 branches around the world, has run a greenhouse project for more than two years. The greenhouse is in Marlborough, Mass., about four towns and 40 minutes away from the Wellesley, Mass., WW office, where executives first conceived the project. Greenhouse leader Christopher Navarro says the experiment has given his team

the freedom to try new things and learn from mistakes without hurting the business. Greenhouse workers carried only about half a normal workload when they first began the project, devoting the

Wellesley office, was drawn to the greenhouse model as a method of cutting both administrative costs and turnaround time. "Wyatt was interested in help with its administrative processes," says Lee,

Setting up a greenhouse operation "is as close as you can get to taking a small piece of the business and spinning it off as a separate P&L."

—Don Hawley

other half of their time to process redesign. Over the project's two-year life, greenhousers ramped up their client loads, and now each one has a full load. Navarro says the greenhouse workers already have cultivated processes that could save time and reduce costs for the entire company.

According to Hawley and Symmetrix Associate John Lee, who were involved in the early planning stages of the project, Dan Holmes, former WW vice president and managing consultant for the

"but [managers] wanted help such that day-to-day activities weren't disrupted. They wanted a concept with a controlled, spreadable environment." The greenhouse methodology met WW's needs, and a team of WW and Symmetrix people started analyzing benefits administration problems in early 1995.

WW has retirement consulting practices in a number of areas, the most important of which is "defined benefits," which are retirement pension plans paid for by employers. Benefits administration follows an annual cycle that is highly regulated by the federal government, making much of the administrative work repetitive, rules-based and cyclical. Yet Lee says that the administrators supporting WW's retirement benefits practice, whose duties include calculating a corporation's required annual contribution to a pension plan, followed no governing rules or processes. WW consultants worked with one or two dedicated staff members, who were responsible for the entire administrative process for that consultant's clients. Moreover, consultant/administrative support teams developed highly individualized methods of doing business, which varied from office to office. "There had to be a way to make processes more streamlined and productive," says Lee. "They were all working ungodly hours, and everybody had his or her own special way of doing things."

The greenhouse planning team decided to concentrate on defined benefits administration because that constituted the bulk of WW's business. Team members started interviewing WW employees in late February 1995, identifying administrative tasks (as it turned

Gardening Tips

*Thinking of starting your own greenhouse?
Here's some advice on how to go about it.*

- **Plan before you build.** Watson Wyatt Worldwide's greenhouse team spent almost four months analyzing the company's current processes and framing the new processes before they began implementation.
- **Get active corporate sponsorship.** The more they see that senior executives believe in the project, the less comfortable rank-and-file workers will feel about resisting.
- **Prospect for best practices throughout the company.** It's important to determine whether your company has already developed transplantable ideas before trying to build everything from scratch.
- **Hire change supporters.** It seems self-evident, but the success of the greenhouse depends on the occupants' willingness to live with chaos. Hire folks who promote flexibility rather than structure.
- **Physical environment is important.** Spend some time thinking about how to design your greenhouse space to best reflect the goals of the greenhouse. WW's open-space plan eventually won a design award for the company.
- **Don't forget technology.** Starting from ground zero with new processes provides a wonderful opportunity to build systems that truly support the new business needs.

—C. Hildebrand



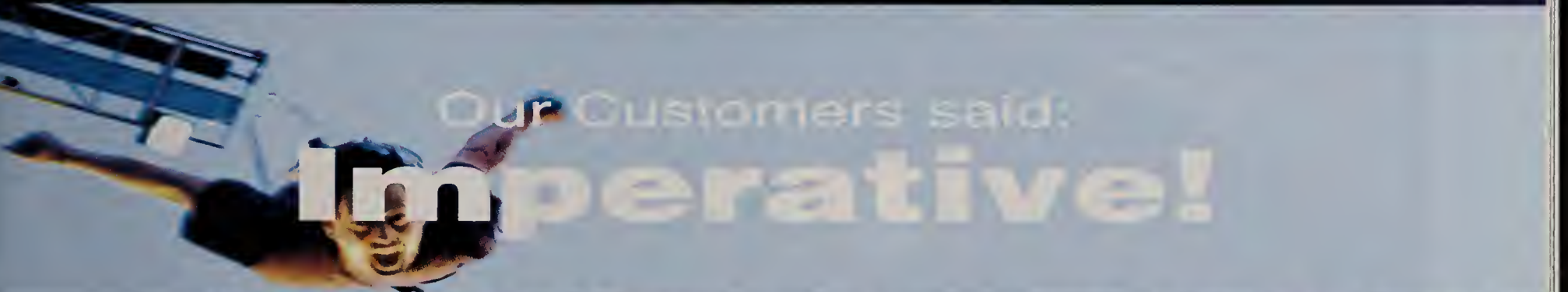
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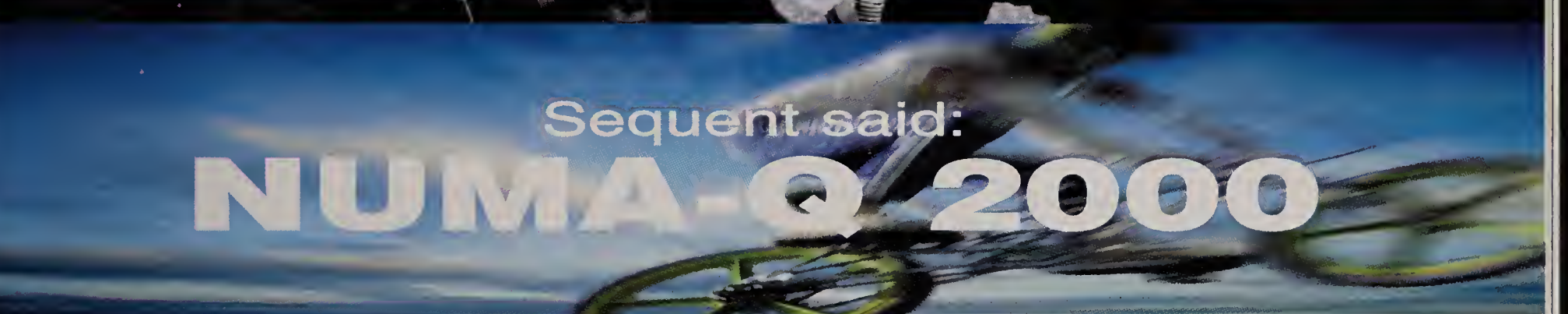
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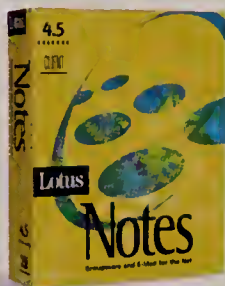
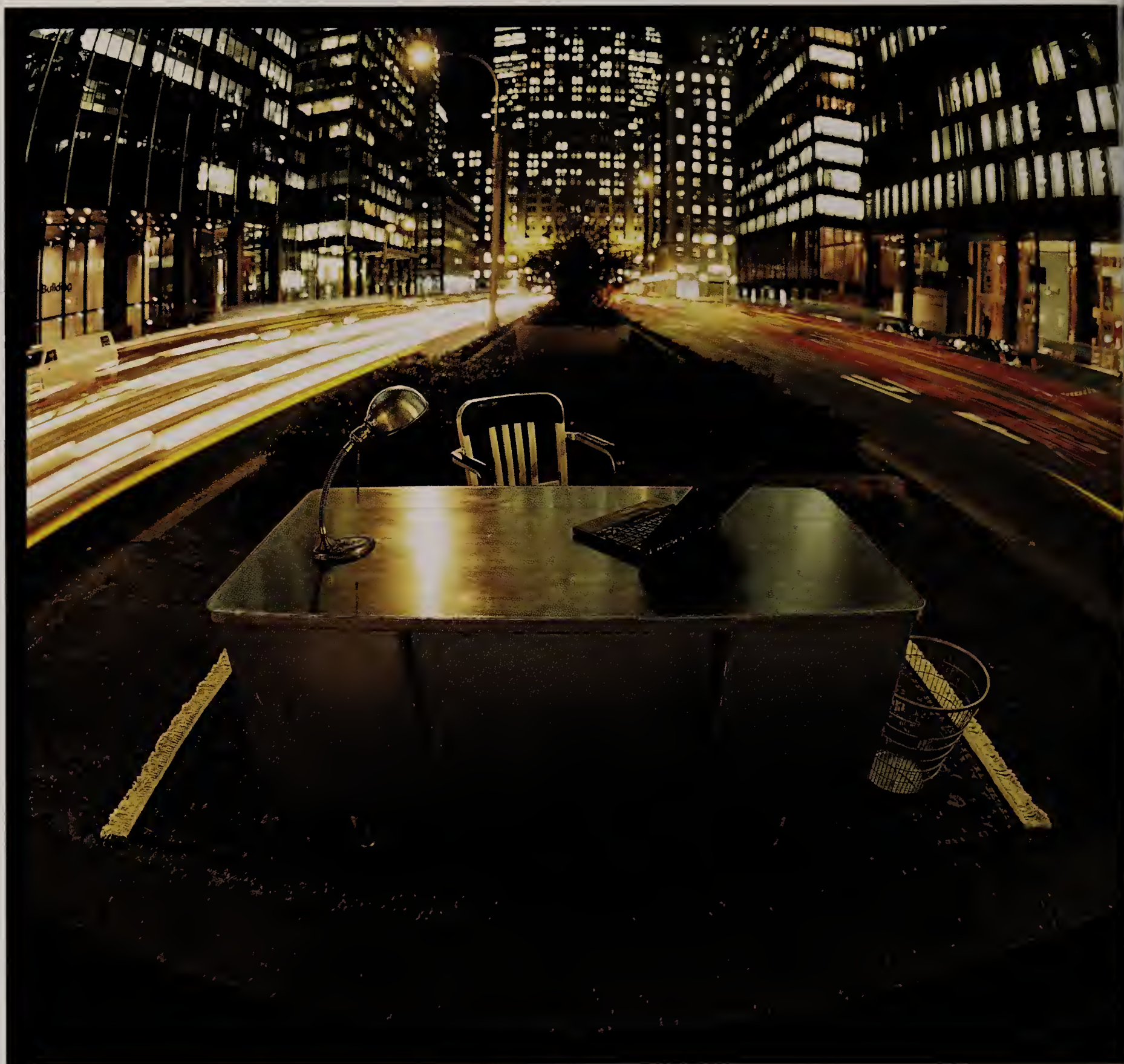
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out, about 70 percent of the work was administrative) and examining how they were carried out. Lee says there was a lot of wasted time in WW's traditional client approach, in which one person performed each step in a linear process. For example, if a benefits administrator were figuring out a company's annual pension contribution, which the company calls a valuation process, he or she would have to send queries for information to the client and other third-party administrators and wait for the answers. "There was a lot of putting down and picking up and getting reacquainted with information," Lee says. "We wanted an environment where you could pick up a different job while waiting for another thing."

The planning team designed a parallel valuation process rather than a serial one, based on standard methods of per-

forming tasks (see chart below). Members also prospected for best practices throughout the company. The planning team wanted greenhouse workers to use agreed-upon processes to work on

The team also began to evaluate the different IT systems used to perform benefits administration, with the goal of making the best systems the greenhouse standards. For example, the team decided

"It was euphoric at first. Then reality sets in. You realize that you still have deadlines and clients, but you're trying to do it in a brand-new way. You get hit with a sense of, 'Hey, this is a lot of work!'"

—Christopher Navarro

multiple clients without having to learn dozens of byzantine, client-specific rules. That would allow workers to pick up a task somebody else had begun, using a standard procedure to complete the job.

to use Pencost, a system built by the Dallas office and used by perhaps 25 percent of benefits administrators, to provide standardized worksheets to determine pension valuations.

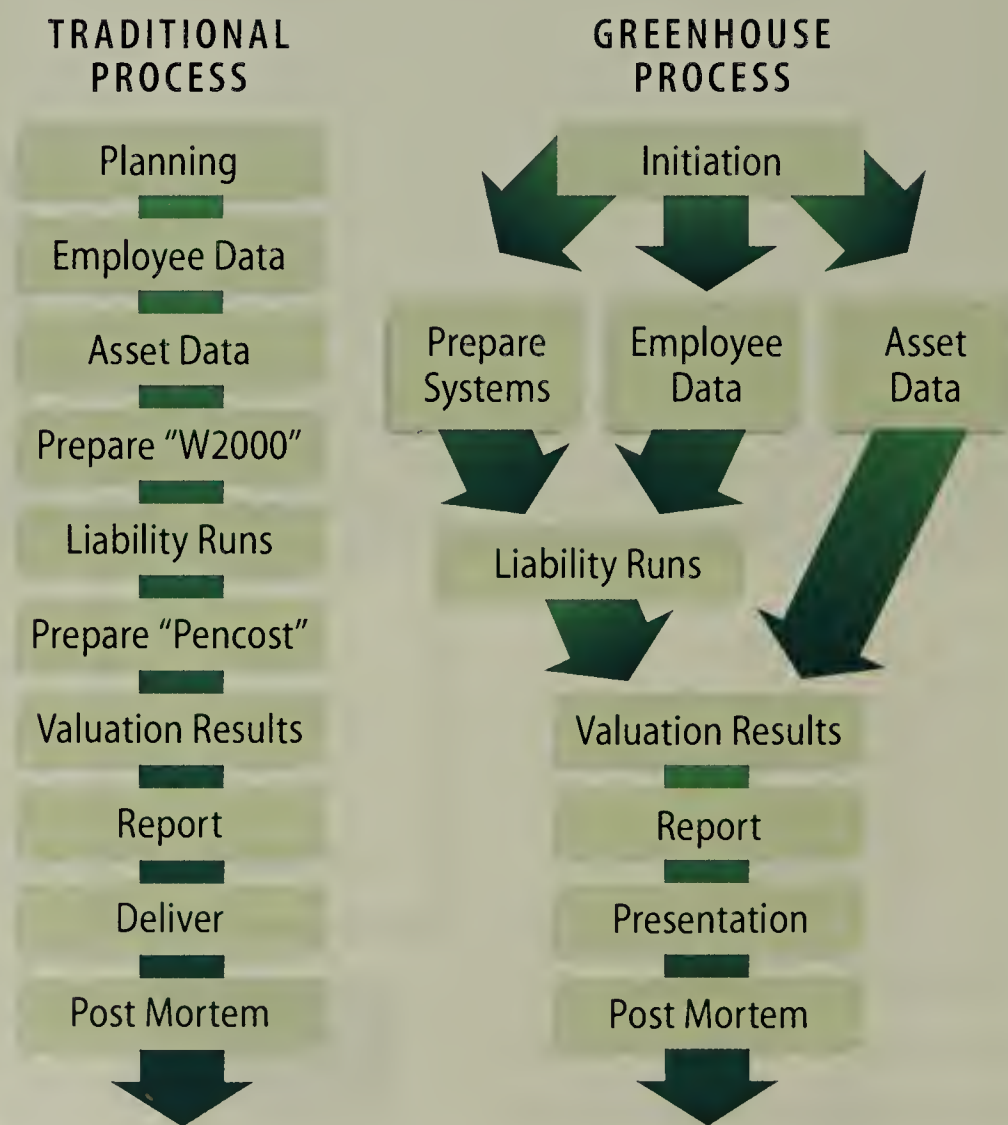
The greenhouse would also act as a beta site for two new benefits administration systems that were scheduled to be used across the company. Since the greenhouse team was in charge of redesigning defined benefits processes, it was also responsible for working out the bugs in the new IT systems built to support those processes. The first was a "data scrubber," a system developed by WW's Office of Information Technology (OIT). The scrubber's purpose was to validate new pension data, check for missing numbers and anomalies, and reconcile the new data with the previous year's information. The second, a workflow system to be built by Symmetrix, would route and track the administrative work on an enterprisewide basis.

Building a Greenhouse

After locating and renting an office building in Marlborough in spring 1995, the greenhouse team faced its next tasks: transforming the physical space into inviting terrain and transplanting suitable greenhouse inhabitants.

Greenhouse leader Navarro says the team rejected the typical "cubes in the middle, offices against the windows" design. Instead, it went with an open floor plan intended to enhance teamwork. The cubes have low walls, and the hallways are wide, with just a single glass-walled office and six unreservable "huddle rooms" situated in the middle

Valuation Process Redesign



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of the space. That way, says Navarro, everybody can enjoy the windows.

When it came to staffing the greenhouse, the team picked a mixture of in-house WW people and external applicants, but they all had to be eager to try the new methods. The group faced some resistance from other WW offices, says Symmetrix Associate Julie Roberts. Some office managers were not comfortable releasing people to work for the greenhouse, fearing a disruption in their own offices. Plus, because greenhouse staff would carry only half a workload, there was a perception among some of the remaining employees that the greenhouse people would not be working hard, even though they were taking on the added responsibility of developing new processes that would ultimately make everyone's job easier. "[But] those are some of the normal challenges of change," says Roberts. She adds that more senior-management support may have helped put those fears to rest.

The greenhouse staff was up to about 15 people when it opened in September 1995 (there are now 18 employees). Navarro says his team went through a couple of break-in phases. "It was euphoric at first," he says. "We felt like we were really contributing new ideas." Of course, that high couldn't last forever. "Then reality sets in," he says. "You realize that you still have deadlines and clients, but you're trying to do it in a brand-new way. You get hit with a sense of, 'Hey, this is a lot of work!'"

Navarro and his group worked through the new processes; they held weekly operational meetings to discuss what was and wasn't working and talked informally about processes throughout the week. Navarro credits the new office layout with encouraging ad hoc discussion and a newfound sense of teamwork—far different from the traditional mentality of, "We only work on this client." He remembers one afternoon when he ran into a problem and asked his next-door cube neighbor to help brainstorm. "All of a sudden, three other people wheeled over, and we started having a conversation about it," he recalls. "We solved the problem right then. In [other WW offices], you can sit next to people and never really interact." It also helped

that everybody was working from a standard group of procedures and could discuss issues from a common reference point.

To integrate IT systems into the greenhouse, the greenhouse inhabitants incorporated similar team-based problem-solving methods. For example,

through several iterations of the system with guidance from WW's CIO. Navarro's team plans to spend April, May and June of 1997—WW's busiest season—putting it through beta testing, and he estimates the system will be ready this fall. Navarro says the team decided to put development of the

One afternoon Christopher Navarro ran into a problem and asked his next-door cube neighbor to help brainstorm. "All of a sudden, three other people wheeled over, and we started having a conversation about it," he recalls. "We solved the problem right then. In other WW offices, you can sit next to people and never really interact."

they used a "war room" to help refine and debug the data scrubber. The idea, says Navarro, is to stick three or four greenhouse people in one room with a couple of programmers from WW's OIT. Rather than test the scrubber with fake or old data, the greenhouse workers used live client data, which gives more realistic results, says Navarro. As workers came across glitches—whether they were technical bugs or process changes—they told the IS folks, and the OIT representatives made the appropriate adjustment on the spot. "It provided instant feedback," Navarro says, and the greenhouse workers were on hand to make sure the system answered their precise business needs. In fact, greenhouse and OIT workers are taking the same war-room approach to writing the training manual for the system, with an eye toward making it process-oriented, not technically tilted.

The greenhouse group approached Symmetrix's workflow system a little differently. The consulting company delivered a prototype in late November 1995, and, after encountering slow response rates with the system, Navarro's group decided to lower the priority on that system's development and finish it in-house to maintain control over the project. Throughout the past year, greenhouse employees have worked

workflow system on the back burner because "with a group of 20 people, we could survive without that system. But it will be necessary when we bring in larger groups of people, like the Wellesley office."

Just how WW is going to propagate the greenhouse culture throughout the rest of the company is undecided, but Navarro says he's sure it will be worth doing. He is currently measuring and documenting the improvements the greenhouse team has nurtured and says that greenhouse procedures have in some cases cut in half the time devoted to administrative work. WW has also been able to turn around projects more quickly. "What used to take two or three weeks to do now goes by like that—in a matter of a week or less," he says. "We can't believe how fast it gets done."

Although Navarro concedes that his team will have to handle the situation carefully, he hopes that the fruits of WW's experiment in controlled messiness will take root and flourish in the real world. He's got a good chance at success if he can show measurable time reductions. After all, as Lee points out, "people argue much less if they see that they can now go home on time." 

Senior Editor Carol Hildebrand can be reached at cjh@cio.com.



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Capturing Innovation

Most people have preconceived—and mistaken—ideas about how innovation occurs. A new study debunks some of the myths.

BY MARY SILVA DOCTOR

IT SEEMS EVERYONE'S TALKING OR writing about how to fuel business growth. Having trimmed their organizations during the inwardly focused reengineering era, executives are looking outward again for ways to expand. As often as not, expansion involves innovation, and these days, information technology is at the heart of such activities. CIOs and their business partners are looking with renewed interest for hot new technology ideas and applications to provide strategic advantage.

In a recent Omega Point Consulting study of 37 Fortune 500 companies,

75 percent of IS executives surveyed indicated that innovation through IT is a very important issue for their companies. "IT innovation important?" asked one retail industry CIO. "It's absolutely a survival issue."

The path to IT innovation seems simple enough: You see the need, you recognize the potential for IS to contribute to a hot and high-value activity, you try innovating, and soon you'll see the results. Right?

Wrong.

As we analyzed the 57 IT-enabled business innovation examples provided by the CIOs and other IS and busi-

ness managers we surveyed, we learned that very few companies routinely innovate their business through IT. We also heard some widely held opinions and assumptions that, left unaltered, will lead to shattered expectations and disappointment. In the words of organizational learning experts, we found a few key mental models that must be "unlearned" if IT and business executives are to succeed with innovation.

The following are the four main myths about innovation and what you can do to dispel them.

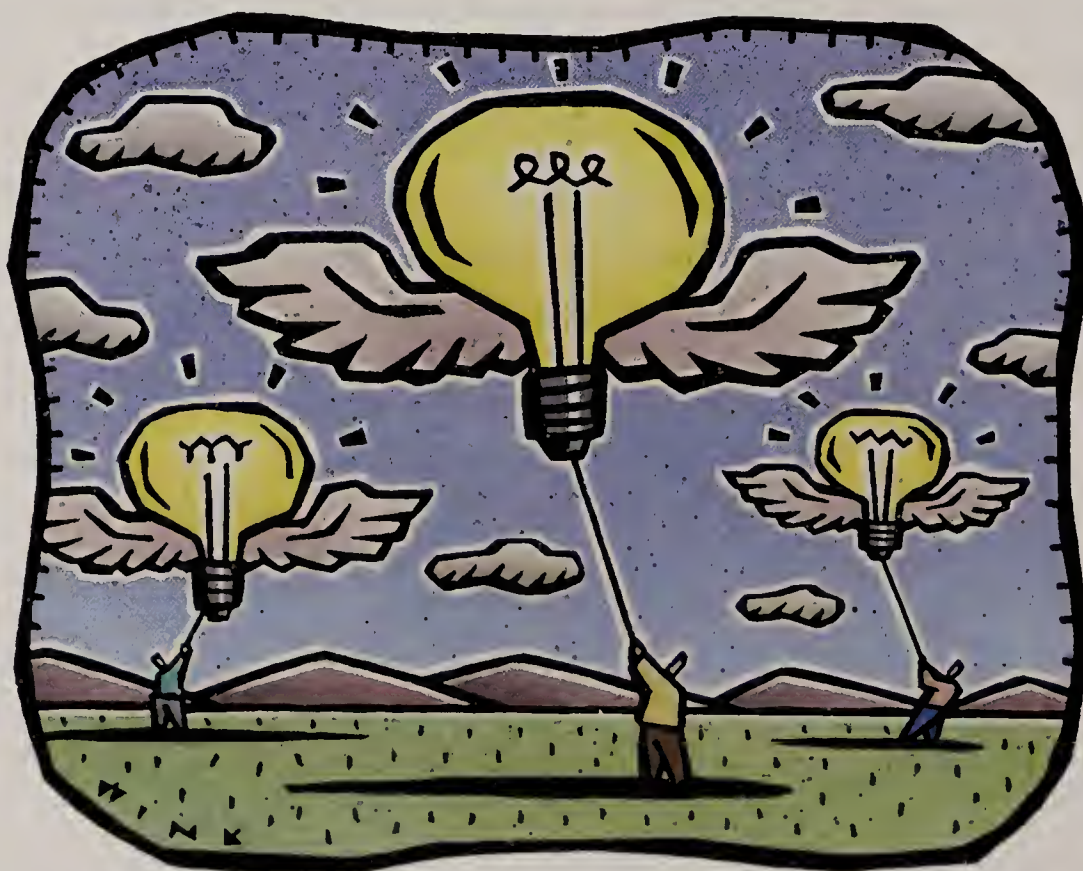
Myth Number 1: Innovation is inherently a creative activity and can't be structured.

Over and over, IS managers voiced this opinion. They believe innovation is serendipitous—that its success is due to the unique skills of particular individuals and is largely a matter of luck. Remember when that was the widely held view on systems development?

Quite to the contrary, our findings about success in innovation are reflected in the sentiments of one CIO who believes, "you *can* institutionalize innovation processes and practices—just look at 3M." It is possible and even desirable for IT executives to become more deliberate about innovation.

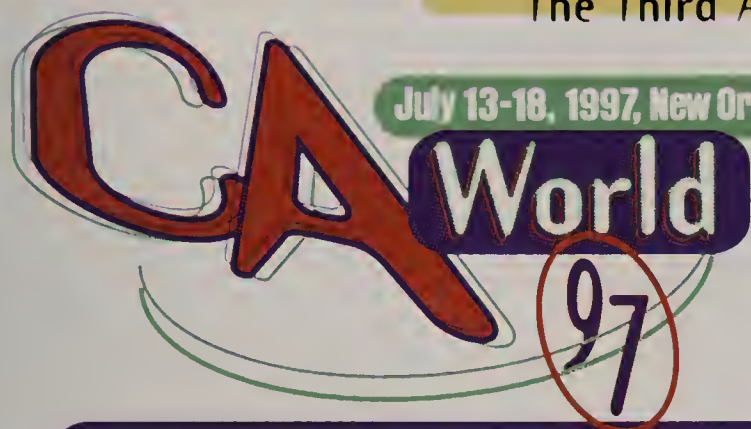
When successful innovators are asked what it takes to succeed with innovation, they talk about an innovation process. Indeed, we uncovered a process for successful IT-enabled innovation during the course of our study (see box, Page 52). IS organizations that explicitly manage the activities embodied in this process are more successful at contributing to technology-enabled innovation at their companies. Conversely, IS managers who continue to view innovation as an unpredictable activity generally have little if any impact on innovating business through IT.

Advanced development groups are one effective way to explicitly manage



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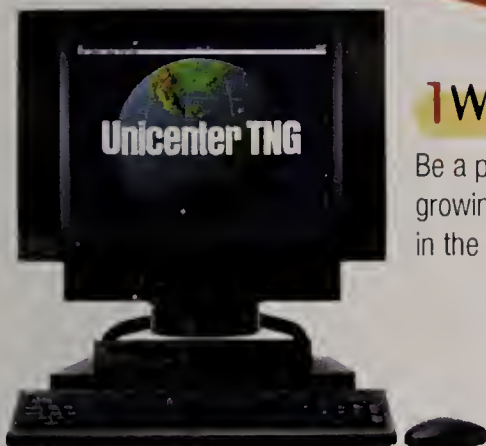
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Expert Advice

innovation. One financial services company broke the mold with respect to how it formed and runs its advanced development activity. No longer composed solely of technologists experimenting with the latest and greatest, this group is equally skilled at managing the organizational change issues associated with true innovation. The group's members spend as much time and energy nurturing relationships with business executives as they do scouting technologies.

Myth Number 2: IS managers should lead and drive technology-enabled business innovation.

Those who harbor this opinion end up thwarted and frustrated. We found that technology-enabled business innovation is fundamentally a business activity. Most successful ideas for innovating a business using technology (i.e., those that get implemented and yield results) come from business people. Their deep knowledge of how their businesses work and what is valued in their marketplace positions them to recognize specific technology opportunities. The exceptions are in financial services, where information and the technology that enables it *are* the business. There, IS managers often possess a level of business knowl-

IS managers who continue to view innovation as an unpredictable activity generally have little if any impact on innovating business through IT.

edge that enables them to conceive successful innovations.

That's not to say there isn't an important role for CIOs. In most of the innovation stories we heard, IS professionals provided invaluable ideas and opinions; they catalyzed the process in their companies. Many of the innovative ideas emerged from lively conversation between the business manager and his or her IS counterpart, and more than one valuable innovation was born on the back of a napkin.

IT-enabled business innovations span

A Process for IT-Enabled Innovation

There are four phases to successful innovation:

1. Exploration The object of the first phase is to increase knowledge about possibilities for IT-enabled innovation and its potential value to the business. Many of the techniques used in exploration are externally oriented and involve scanning the marketplace to keep abreast of business and technology trends. One of the more interesting practices is to participate in the company's market research activities so that IS managers can hear the voice of the customer firsthand.

2. Conception The goal of this phase is to develop a clear vision of a specific IT-enabled business innovation. The result might be a set of ideas around a new or changed product or service, enhanced ways of interacting with customers or suppliers, or transformations in business or IT processes. During this phase, an idea for IT enablement (e.g., "Have you thought

about Web-based technologies?") can become a specific opportunity ("We will have an entirely new way to process claims").

3. Demonstration In this phase, one must generate sufficient evidence that a given vision is achievable and can produce the promised business results. A prototype of new technology and process is a common outcome. Effective prototypes are fully functional (not storyboards) so that business partners can truly understand the potential business value and determine whether to make additional investment.

4. Implementation During implementation, an innovation is scaled as necessary and rolled out to the target population. Successful implementation is necessary to achieving business benefits. Study participants stressed the importance of moving quickly during implementation because innovation often offers only a limited window of opportunity. Some companies are striving to become expert at rapid implementation by developing a comprehensive, repeatable rollout process or forming cross-functional "SWAT" teams to perform implementation work on a regular basis.

—M. Silva Doctor

boundaries between business and IT. A common thread in innovation successes is the presence of what one business manager terms a "translator." The translator can be a business person or, more often, an IS professional responsible for bridging the two worlds. The purpose of that role is to keep the innovation on track toward implementation by making sure the business objectives stay in focus. Translators prevent projects from getting derailed by the excitement of playing with cool, new technology.

Myth Number 3: We can't innovate here because our business executives don't understand or appreciate IT.

It's true that the mind-set of business executives

is an important condition for innovation success. But it's only half the story.

We found many situations where the IS mind-set provided an equally strong barrier to innovation. When asked about IT-enabled business innovation, some IS managers cited examples—a wide area network or changes to the software development process—that clearly were not centered in a business-value perspective. As one business manager said, "Technology is cool for only a small subset of the population." She says a lack of business perspective among the IS folks got in the way of innovation at her company.

Sometimes business and IS executives are of like minds but use different ter-

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minology. One IS group consciously shifts to the language of business when discussing technology initiatives. This simple shift already is paying dividends of more effective partnering, according to the group's IS executive.

And, no doubt about it, business is looking for a partner; IT-enabled business innovation requires substantial technology expertise. Yet business partners will turn elsewhere for that competence if IS managers don't demonstrate an understanding of their business and speak in terms of business value.

Myth Number 4: Innovation is about ideas.

When we asked managers to describe their practices for innovation, most showed a preference for the activities associated with generating and testing ideas—networking with vendor experts, conducting pilots, etc. But managers who were successful at innovation were as likely to talk about implementation as

A common thread in innovation successes is the presence of what one business manager terms a "translator." The translator can be a business person or, more often, an IS professional responsible for bridging the two worlds.

they were about ideas. "It's not an innovation unless it's implemented," said one.

Not only that, but based upon the insights gleaned from the examples we heard, it appears that innovation must be managed and implemented differently from traditional technology deployment. The typically structured, lengthy deployment and rigid measurement practices of traditional development can prove fatal to innovation.

In large part, that is because there's often a time dimension associated with the business benefits of innovation; you'll capture the needed share only if you're first to market. One market-driven project missed the window of opportunity

when it got bogged down in the company bureaucracy. As the business case eroded, so did project sponsorship.

But the need for speed must be balanced by the need for relevance and the ability to achieve full deployment. One practice that doesn't seem to work is "skunkworks"—an informal and often underfunded trial development effort. Although many suggest that skunkworks can be an effective way to move quickly, nearly all study participants acknowledged that it is virtually impossible to achieve large-scale deployment from these projects. In a skunkworks project, the team is often unencumbered by standard work practices and technology standards.

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Nick Hanauer, Sr. Vice President, Sales and Marketing, Pacific Coast Feather Company.

As a result, it can be difficult or even impossible to scale or integrate the resulting solution. "On more than one occasion, speed and stealth led to a poor project outcome," one manager said.

A few companies are taking lessons from venture capitalists, setting up pools to fund potential innovations. The objective is to maximize the pool's return rather than seek a return on each and every project. By using that approach, managers don't need to be tied to the budget process when testing new ideas.

The time for innovation is now. The market demands it, and technology makes it possible. You can serve as a catalyst for the rest of the organization by gaining the necessary skills and perspective for this critical competence. Or you can cross your fingers and leave it to chance. **CIO**

Mary Silva Doctor is a managing partner at Omega Point Consulting, an IT management consulting firm in Roswell, Ga. She welcomes comments at msdoctor@omegapt.com.

The Shape of Innovation

Business/IT partnerships don't happen in a vacuum

BRINGING TOGETHER DEEP business knowledge (how the business works and its critical market drivers) with knowledge of IT possibilities is a key capability for innovation success. "It takes a 'business-savvy' IT person in partnership with an 'IT-savvy' business person to see the opportunity and capitalize on it," according to one IS executive surveyed. But partnership alone won't lead to innovation unless the mechanisms for discussing and reviewing ideas are in place. Those can include IT governance bodies, multidisciplinary project teams and

"translators" (see main article).

IS organizational structure may be a factor as well. IS professionals located in and with the business appear to be more successful in innovating with their business partners than their counterparts serving the organization from a shared or central resource.

There are a number of reasons for that. Business-unit CIOs focused on serving a single unit can develop greater knowledge of the business. Moreover, their proximity makes it easier to develop solid, trust-based relationships with their business partners.

Of course, business change that is confined to a particular division or business unit generally has greater chances for implementation success than innovation that is larger in scope. In the business-unit setting, the division leaders and their IT partners will have the authority and power needed to direct the change.

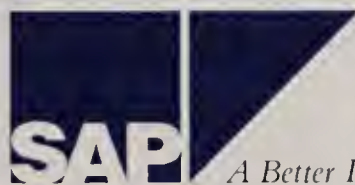
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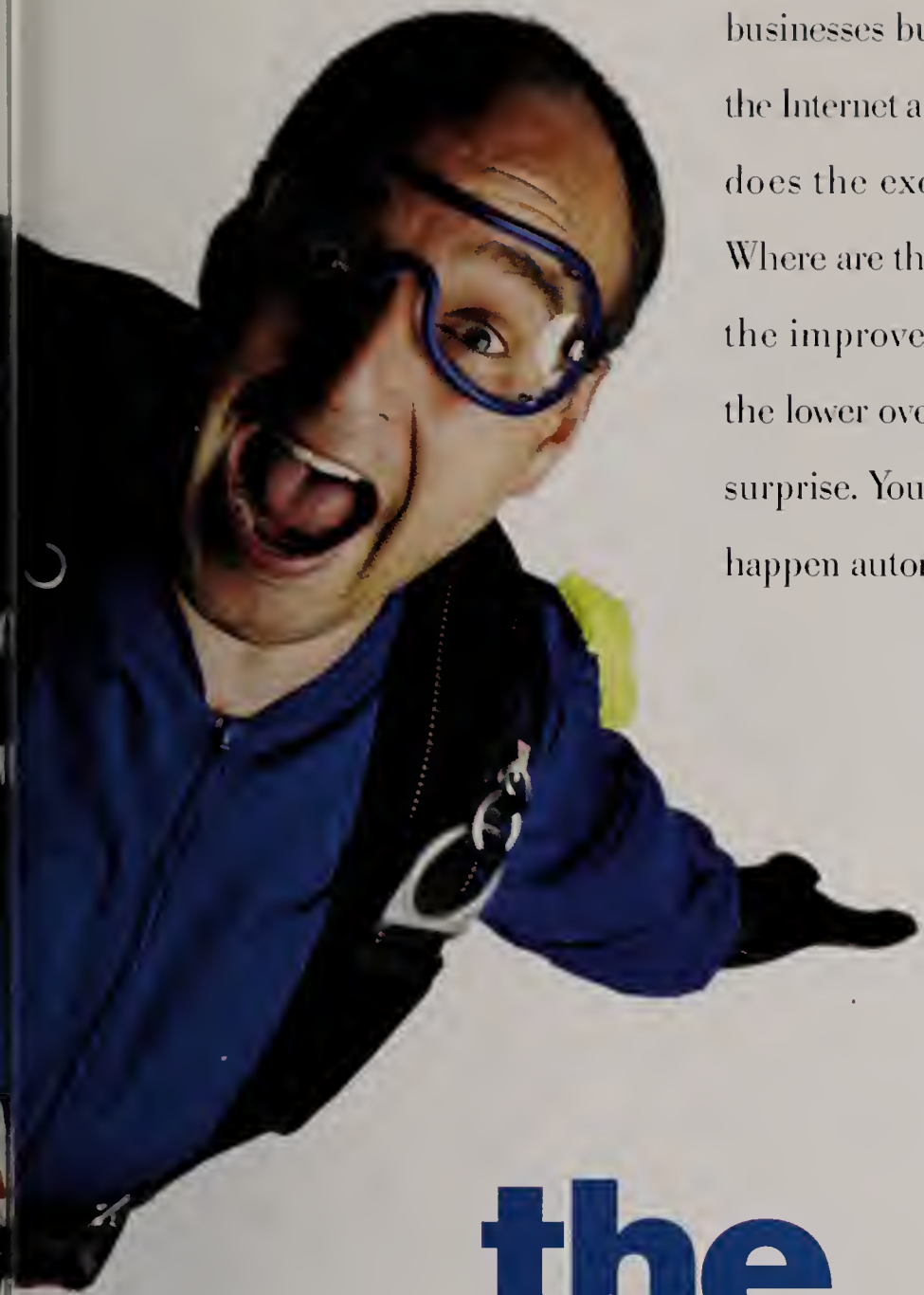
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ALTHOUGH PUSH TECHNOLOGY'S POTENTIAL IS great, CIOs need to be aware of its risks. In addition to exploring the benefits of push, this article explains:

- ▶ Why push technology can clog corporate firewalls and how companies are coping with the problem
- ▶ The dangers of accepting content that contains executable code
- ▶ Why CIOs should worry about the relevance of information being pushed
- ▶ The politics of exercising control over pushed content

*The appeal of push technology far exceeded **BOB BERTRAND's** expectations.*

Push technology hype has approached fever pitch. Is push cool? You bet.
Is it hassle-free? Nope. Can you afford to ignore it? Not on your life.

BY LYNDA RADOSEVICH

At first, Bob Bertrand figured he'd save himself a spot of manual labor.

On Sept. 24, 1996, Bertrand, a programmer analyst at Houston Lighting & Power Co., installed server software that promised to minimize data traffic traveling between employees' desktops and the Internet. To test the new server, Bertrand hoped to get a few people in the power generation division to use PointCast, the Internet news service that broadcasts directly to personal computer screens. Rather than manually install PointCast client software on workstations, he created a script on the LAN menu that employees could invoke to install the program automatically. He didn't say anything about the new option. He didn't even send out an e-mail. He figured a handful of curious users at a time would pick PointCast from the menu, and he'd be able to measure server performance as traffic grew.

ING IT

Bertrand was partially correct. A few people downloaded PointCast. Then those people told other people, and word spread. On Oct. 2, there were 29 users. That grew to 116 users by Nov. 4 and to 281 by Nov. 18. By early February, 784 people in the 2,200-person division were using PointCast.

"It was a geometric progression. The entire group hit that pick," marvels Bertrand. Some of them had never used the Internet. But whether they were beginners or old pros, they took to the notion of having Internet news delivered to their desktops like capitalists to money.

The speed with which they did so "presented support problems for us because we weren't geared up to support that big a crowd," Bertrand says.

Bertrand's experience is emblematic of the world of "push" technology—by innumerable accounts, the biggest thing to hit the Internet since the Web. Boston-based researcher The Yankee Group predicts the push technology market will generate \$5.7 billion in revenues out of a total \$19.1 billion annual Web marketplace by the year 2000, and new push technology vendors are popping up almost daily. (See "Push Products," Page 66.)

Akin to television and radio broadcasting, push delivery, also known as Webcasting, lets users passively receive broadcast information rather than actively search the Web or intranet

PUSH TECHNOLOGY

ALAN MARIOTTI:

Push delivery is more compelling than e-mail for corporate communication.

sources for information. But unlike television, push technology allows recipients to choose from a menu of sources, specifying what kind of information they want to receive. Then it just shows up on the desktop. No work required. Just sit back and enjoy.

Internet news services are only one form of Webcasting. Companies can use push technologies on intranets to deliver timely corporate information to employees. And new models of push technologies deliver application logic with the content; so, for instance, an insurance company can send potential customers information on new policies along with a miniature spreadsheet that models different plans for them.

"It's a perfect facility for...human resources department updates, for corporate communication, for the blood drive, for employee recognition, for anything that a corporation does that it really can't communicate through the loudspeaker, voice mail, paper or even e-mail, which is dry and boring to look at," says Alan Mariotti, a PointCast user and manager of information technology at AlliedSignal Technical Services Corp. in Columbia, Md. In fact, some IS managers view the combination of cross-platform Web browsers with delivered content and applications as the next-generation user interface. "I see it as a replacement for the Windows desktop," says Bertrand.

Still, like any new wonder technology, push has some unheralded risks. Unmanaged updates from the Internet can clog corporate firewalls; security issues can arise if the delivered content contains executable code; and the delivered information must be pertinent for the recipients (whether they're inside or outside the company) or they'll lose interest. Also, information must be relevant to the business strategy, otherwise it wastes corporate resources. "Is it business-critical for people to get sports scores throughout the day?" asks Michael Heylin, senior associate at Creative Strategies Consulting Inc., a San Francisco consulting firm. Perhaps for a bookie, but not for most professionals.

Some managers have reacted to problems by banning services such as PointCast. Besides earning those managers low scores in end-user popularity contests, such a strategy keeps employees from getting legitimate information, and it's a stopgap measure. With software powerhouses Netscape Communications Corp. and Microsoft Corp. building support for push technologies into their next-generation Web browsers—due for commercial release around mid-year—push is on its way. So, now's the time for IS and business unit leaders to proactively consider how to make sure this new delivery mechanism is best applied to their companies' business strategies.

THE BASIC IDEA BEHIND THE PUSH delivery model has been around for a long time. Although e-mail broadcasts are perhaps the most familiar example, proprietary software and services also have been used to deliver automatically everything from news to software updates. But the convergence of push technologies and the Internet's vast resources and broad reach is what has unleashed enough hyperbole to make P.T. Barnum blush.

Not that push technology isn't cool. The best-known type of push delivery is the news broadcast that quickly made its way to 1.5 million desktops after Cupertino, Calif.-based PointCast Inc. introduced it in May 1996. Users download software from the company's Web site, determine the frequency with which they will receive services and subscribe to a variety of "channels," such as weather or finance. PointCast, which has deals with popular publishers including *The Wall Street Journal* and Cable News Network to provide content, broadcasts constantly updated information that, in one of its two interfaces, appears on the user's desktop as a screen saver. There's no cost to the user because the information is delivered with advertising, and

users view their custom-tailored news offline, so there's no waiting for downloads.

The technical problem with that model, as some IS managers

MAXIMIZING PUSH'S VALUE

IS executives can help their companies take advantage of push technology by

- Devising the most efficient means for employees to receive outside Webcasts
- Setting up corporate channels for sending company information to employees, customers or trading partners
- Getting involved in making certain the pushed content fits the format

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Push With a Twist

Push by any other means still smells sweet to Smith Barney

EXPERTS OFTEN COMPARE the push technology phenomenon to television broadcasting. Smith Barney is taking that comparison literally. As part of a larger retail branch systems rollout, the retail brokerage firm is implementing a system called NextGen that will send multicast video broadcasts from headquarters in New York over satellite and local area network links to 11,000 financial consultants in branch offices across the country. The system will also be used for training, branchwide briefings and executive announcements.

Currently, Smith Barney consultants attend daily teleconference briefings on market news, or for less timely matters, they receive videotaped materials. But audio isn't as compelling as video briefings are, and even videotapes must be viewed in a conference room where busy consultants may not get to them. When NextGen is completed in a few months, Smith Barney experts will broadcast analysis from a New York studio in real-time. On the other end, a window will pop up on the financial consultants' desktops and display the analyst talking and showing charts and graphs.

In an age when everyone easily can get market data from America Online or dozens of new push services, Smith Barney must make certain its financial consultants can provide additional analysis and a Smith Barney twist on breaking news. The broadcast system will help them do so. "If we can interpret information more effectively for the financial consultants, present different points of view and present graphical information, they can give better advice, which is why we expect customers to do business with us," says Mel Taub, CIO at Smith Barney.

A couple of factors make Smith Barney's system unusual. Most broadcast video systems are out-of-band setups that involve their own cabling and distribution boxes and additional components. This one uses the existing LAN infrastructure to broadcast video.

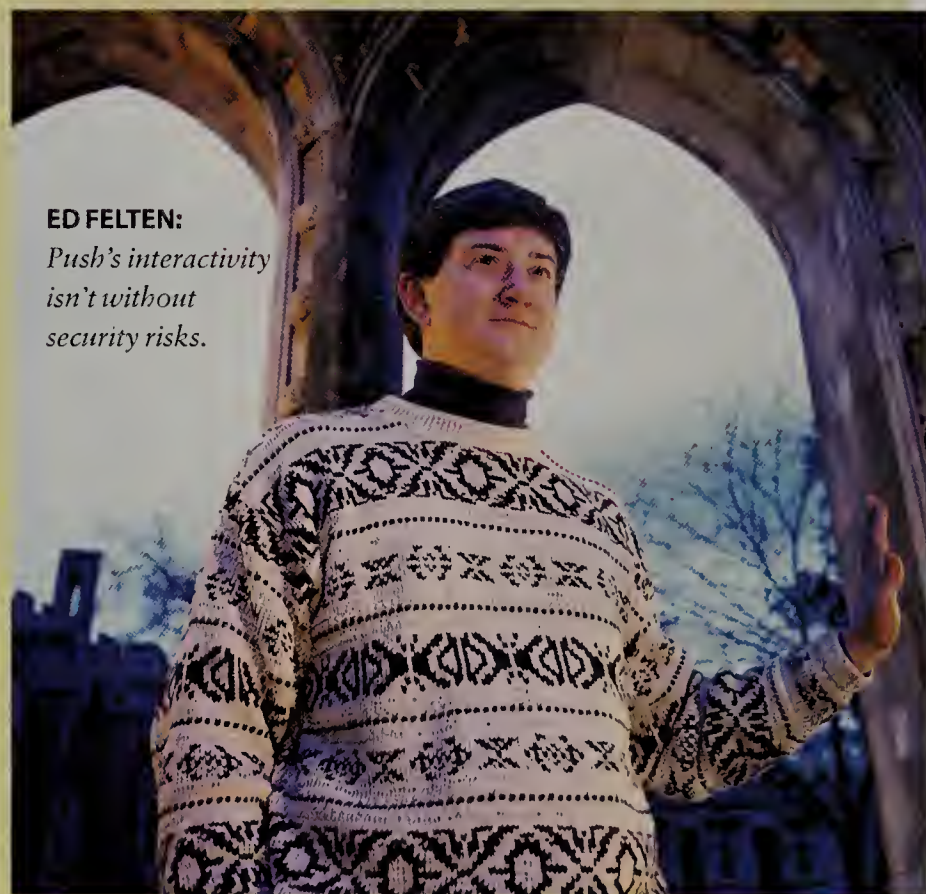
"We're leveraging our network infrastructure and adding another data component, really, but it just happens to be video data," says Joe Twaronite, NextGen implementation manager. "So, in a sense, we're using our available bandwidth on the LAN for free." And unlike PC videoconferencing, it is a one-way broadcast, which is more practical and less expensive when dealing with thousands of financial consultants, Taub says.

The system comprises a digital camera linked to an encoder that feeds data to the satellite system. A Compaq ProLiant server running StarCast video server software from Starlight Networks Inc. in Mountain View, Calif., picks up the broadcast at each branch and sends Internet Protocol multicasts of MPEG video at 30 frames per second over 10Mbps switched Ethernet links to the desktops.

—L. Radosevich

quickly learned, is that it hogs network bandwidth. Outgoing requests and incoming updates can easily choke companies' firewalls. At Tektronix Inc., a data communications company based in Wilsonville, Ore., nearly 6,500 users have access to PointCast through a combination of corporate LANs and intranet connections, and an unknown number of users are individually polling PointCast at an undetermined frequency. "It's clogging up the networks with a lot of extra activity that we're not sure is absolutely essential," says Bob Schneider, telecommunications planning manager at Tektronix in Beaverton, Ore.

In response to the bandwidth issue, push vendors are delivering proxy servers that store a cache of information inside the corporate firewall. For instance, in companies that use PointCast's I-Server, which shipped in October 1996, client machines receive updates directly from the I-Server rather than having to retrieve information over the Internet. Only the I-Server communicates through the company's firewall with PointCast's Central Broadcast facility. This reduces Internet



ED FELTEN:
Push's interactivity isn't without security risks.

traffic, and administrators can control the frequency of updates. Also, PointCast's Central Broadcast facility compresses transmissions by roughly 50 percent. "Now the amount of information that is being requested from PointCast is at the level of, say, a couple of e-mails per update that you do each hour," says Jaleh Bisharat, senior vice president of marketing at PointCast.

Bringing servers in-house offers an even more compelling benefit: the ability to broadcast corporate channels. Companies have plenty of information available on their networks already, but they can't always count on the users to scout it out. Push delivery is one way to make sure employees get the news they need. First Union National Bank in Charlotte, N.C., is using push software from Intermin Corp. of Seattle to send notices about system outages or slow response times to the desktops of analysts who are support-

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with data located behind a variety of different operating systems—UNIX, MVS. The key thing trying to do is pool that data from all sources and create value out of it. We researched the market a great deal to help with this new information.

Phil Orton, Director of Centralized Operations, Entergy Corporation

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PUSH TECHNOLOGY

ing online banking customers. That is more efficient than sending e-mail because the analysts don't have to log in and check their in boxes to receive updates. "We're sending you basic information flashes that you'd like to have on a real-time basis," says Chris Garland, a systems development consultant at First Union. The next step, he says, is to build an application that sends analysts news flashes with embedded URLs

pointing them to new training materials.

IN ADDITION TO DELIVERING content, emerging forms of push technologies can deliver applications. Marimba Inc., a Palo Alto, Calif., startup, is making a big splash with its Castanet software, which became available in October. Castanet includes "tuner" software that automatically re-

Push Products A sampling of Webcasting vendors and their products

BACKWEB TECHNOLOGIES INC.

San Jose, Calif. 408 437-0200

www.backweb.com

BackWeb Client: Free client software for receiving broadcasts and software updates from the BackWeb service, which includes roughly 40 channels. The broadcasts can be delivered in the form of screen savers, wallpaper or pop-up messages that users can click for the full content. The client also works behind firewalls.

BackWeb Server: Server software and utilities for creating channels and managing update schedules. Server software is free, but broadcasting service starts at \$10,500 depending on channel volume.

CARAVELLE INC.

Ottawa 613 225-1172

www.caravelle.com

Transceive Receiver: \$49.95 client software that can pull updates from preselected URLs or receive updates from providers via Web pages, e-mail or pagers.

Transceive Transmitter: Server software for delivering pushed content via the Internet or intranets. Prices start at \$3,400.

DATACHANNEL CORP.

Bellevue, Wash. 206 462-1999

www.datachannel.com

Channel Guide: A Java applet that resides inside a client's browser and presents a customized desktop to a user.

Channel Manager: A Java-based server that allows users to subscribe to multiple Webcast channels such as PointCast and Marimba. Price tag of \$7,900 includes client software for 100 seats.

DIFFUSION INC.

Mountain View, Calif. 415 237-8500

www.diffusion.com

IntraExpress Client: Java-enabled software for receiving broadcasts.

IntraExpress: Server software for delivery of information from the Internet or intranets over Web pages, e-mail, fax, pagers or printers. Pricing starts at \$35,000 for a server, 100 clients and support.

INTERMIND CORP.

Seattle 800 625-6150

www.intermind.com

Intermind Communicator: Free client software works within existing browser to access 170 channels from Intermind's Web site or channels on an intranet. End users can publish channels on their intranet; anyone can publish non-commercial channels on Intermind's site for free.

Dynamic Publisher: Server software for creating Web channels and updating subscribers when changes occur in databases and Web site content. Prices depend on usage and audience size.

MARIMBA INC.

Palo Alto, Calif. 415 328-5282

www.marimba.com

Castanet Tuner: Free client software for receiving Java-based applications and information from Castanet channels over the Internet or intranets.

Castanet Transmitter: Server software that distributes Java applets to Tuners. Other server software includes a proxy server for minimizing bandwidth usage on corporate Internet links and a repeater for sending broadcasts to larger groups

than one transmitter can serve. Prices, which are based on transmitter capacity, begin at \$1,000.

POINTCAST INC.

Cupertino, Calif. 408 253-0894

www.pointcast.com

PointCast Client: Free client software for receiving broadcasts from PointCast's service. Information can be displayed in the PointCast application or as a screen saver.

I-Server: Server software for corporate intranets that enables companies to control information coming in from the PointCast service and to publish their own channels. I-Server is priced at \$995.

WAYFARER COMMUNICATIONS INC.

Mountain View, Calif.

415 903-1720

www.wayfarer.com

Incisa Client: Software receiver for server updates

Incisa: Intranet Webcasting server software aimed at companies that want to push information from the Internet and from internal systems to their employees' desktops without advertising. Prices start at \$5,000 for 100 seats.

XCELLENET INC.

Atlanta 770 804-8100

www.xcellenet.com

NetEssentials SessionXpress: A scripting language for creating objects that automatically deliver, retrieve and update client applications and Web pages. A basic version of the software is available for free. Support for eight concurrent users or sessions to unlimited sessions ranges from \$4,995 to \$9,995.

—Compiled by L. Radosevich

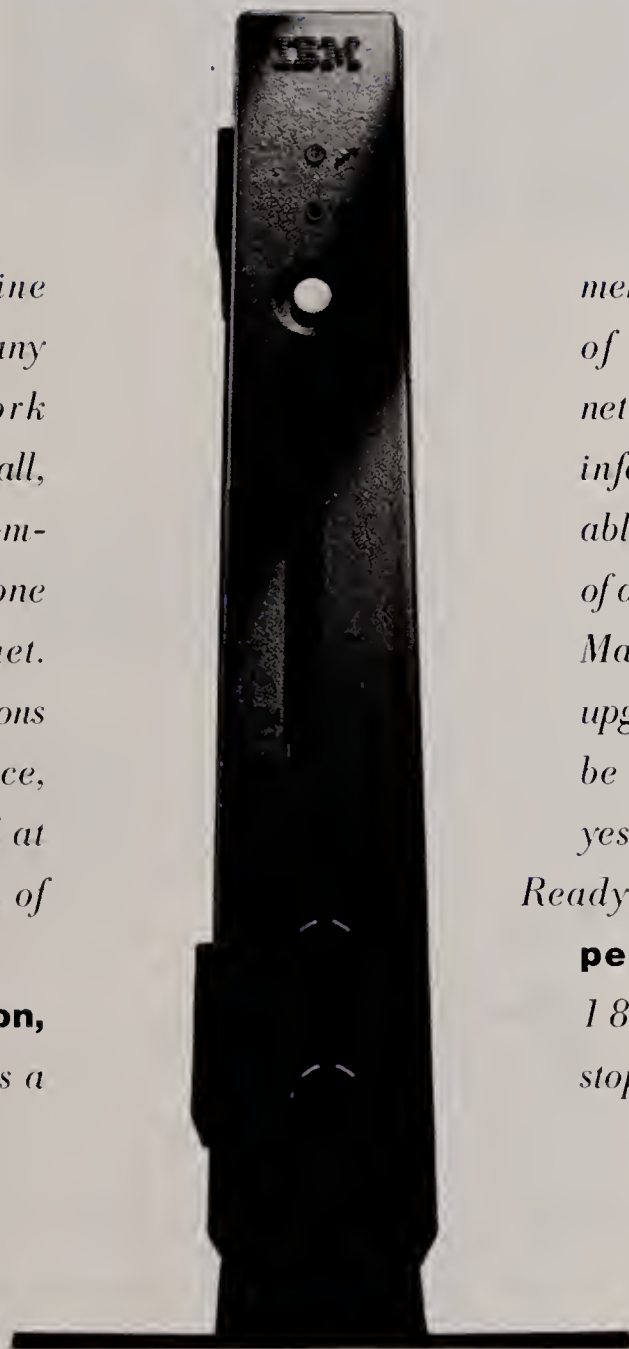
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CHRIS GARLAND:
*Make sure employees
get the news they
need in real-time.*

trieves information from "channels" on a server. The information can include small Java programs, or applets, that deliver program functionality to users without requiring them to install anything.

By pushing Java applets along with content, companies can more easily deploy interactive applications for computers, pagers, kiosks or just about any platform. For instance, Trilogy Development Group Inc., a software company in Austin, Texas, is considering using Castanet to build prototype customer information kiosks for one of the Big Three automakers. The kiosks likely will work like this: Castanet will be used to automatically push both customer-facing applets and updated inventory information for salespeople to kiosks at dealer showrooms or shopping malls, according to Allan Drummond, director of sales and marketing in Trilogy's Internet business unit. Once potential customers enter their features wish lists (color, stereo model, seat type and so on), the applet will tell the customer what car models have the selected features and which dealers stock those models. If nothing fit the customer's specifications, the applet would suggest alternative models and dealers. Because updated inventory information as well as the interactive applet will get pushed to the kiosks together each time a customer logs in, the automaker will be able to modify the program easily

as business needs change, and customers will always get accurate information. "[The company] does not want to have 6,000 dealerships with kiosks in them and have software re-installed every month," says Drummond. "This push model is more appropriate than sending the installation force into the field."

That type of application delivery is where the Web's big guns are pointed. Microsoft's Internet Explorer 4.0 browser, scheduled to ship around mid-year, will support Microsoft's push mechanism called Active Desktop. Active Desktop will receive pushed content and programs in the form of Java applets or Active X controls, which are small programs based on Microsoft's object technology. In March, Microsoft floated a proposal for a standard way of delivering pushed content, which could help drive the market. Meanwhile, Netscape is integrating the Castanet tuner into the next version of Navigator, a combination groupware and browser package called Communicator.

But while Java applets and Active X controls can make the Web experience more interactive for users, they also can pose a major security risk. Those miniprograms can house executable

code, which, if written by a malicious person, can wreak havoc on a user's machine. Java has a built-in security mechanism called a "sandbox" that limits an applet's ability to access system files. But Active X has no sandbox. Instead, Microsoft wants users to accept only Active X controls that carry a digital signature from a trusted source. If a user slips up and admits an unfriendly control, the results could be bad. "Once an Active

"The technology is moving ahead of security options available to manage it. Pushing text and data is fine, but when you get into the executable world, it opens the door for hackers to create a virus or get into sensitive information."

-ALAN MARIOTTI

X control is running on your machine, you have no way to constrain what it does," said Ed Felten, head of Princeton University's Safe Internet Programming Team and an expert at cracking security systems.

Vendors are working on security measures for push technologies, such as servers that cache untrusted applets until an IS manager approves them. But not all IS managers are convinced the security measures are strong enough yet. "The technology is moving ahead of security options available to manage it," says AlliedSignal's Mariotti. "Pushing text and data

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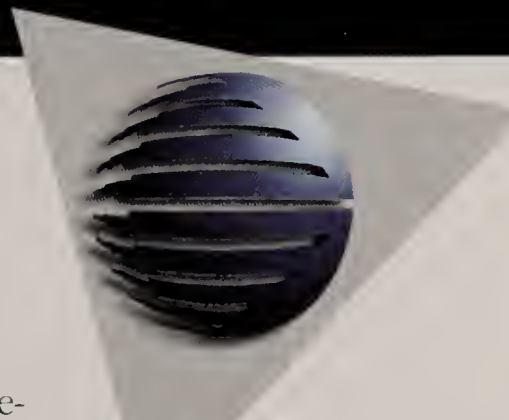
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PUSH TECHNOLOGY

is fine, but when you get into the executable world, it opens the door for hackers to create a virus or get into sensitive information."

ONCE TECHNICAL ISSUES such as bandwidth and security have been resolved, the more difficult work begins: making certain the pushed content is relevant. In PointCast, where content is free, the ads that support it can be a concern; some companies don't want their competitors' ad banners blazing across employees' desktops. Also, when there's a constant barrage of information flowing across their screens, people can tune out. "If you push something in someone's face four or five times and the quality isn't there, they'll turn the mechanism off, either physically or mentally," posits Mitch Hadley, vice president of strategic technology at NationsBank in Charlotte, N.C. "How many McDonald's signs do you see now when you drive down the road? None, because you're not interested in them. They've been pushed at you so much, you don't even see them."

Hadley is piloting a push technology system called Incisa from Wayfarer Communications Inc. of Mountain View, Calif., because it gives him more control over the pushed information than he might have with other Webcasting vendors. The system is used to send relevant news flashes—such as an announcement from the HR department about new 401(k) options or a message from the chairman about company expansion—to desktops of pilot users. Those who want more information can click on a link that will take them to the corporate intranet. NationsBank is also trying out pushing its Reuters newsfeed, but as Hadley observes, news of natural

"People like autonomy; they like ownership of their desktops. Take that away too much, and there are bound to be repercussions."

—TOM HARTLEY

disasters on the other side of the world probably isn't relevant to a banker's job. To give users control over what information they receive, Hadley and his team set up specific channels to which they can subscribe, including a news channel (which can be broken down further into just banking or finance news), a stock channel and an "everyone" channel. Members of the strategic technology group may also sign up to receive group-specific news. There are no ads, so it's not cheap. The Incisa server pricing starts at \$5,000 for 100 seats, and it's difficult to calculate the cost of developing internally generated content. "The trade-off between free content and content you either pay for or build is quality and control," says Hadley.

(PointCast plans this summer to respond to IS managers' need for more control with a second version of I-Server. New features under development but not confirmed at press time



MITCH HADLEY: *If pushed content isn't relevant, users will tune it out either physically or mentally.*

will allow IS managers to block advertising, turn off a restricted set of channels and create separate channels for different workgroups. The new version is also slated to include hooks via Lotus Notes into relational databases such as Oracle, says Joe Pistrutto, vice president of server engineering at PointCast.)

But with added control comes a different danger: political accountability. And if IS managers exercise too much control over content, end users are likely to object. "People like autonomy; they like ownership of their desktops. Take that away too much, and there are

bound to be repercussions," says Tom Hartley, a consultant with GeoPartners Research Inc., a telecommunications strategy market consulting firm in Cambridge, Mass.

Ultimately, CIOs will have to strike a balance between push and pull delivery and come up with policies governing what kind of information is best suited to each delivery mechanism. Hadley envisions a unified interface that provides access to pushed content, e-mail, Web pages and an intelligent, natural language search engine that links to desktop, corporate network and Internet-based data sources.

Perhaps then it will be time to throw away the Windows desktop. **CIO**

Lynda Radosevich is a senior editor at InfoWorld. She can be reached at lynda_radosevich@infoworld.com.



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A Tough SELL

Devising the ideal infrastructure plan for your company is only half the battle. Convincing management of the need to invest in it can be even harder. Here's some tried-and-true advice from IS executives who've successfully made the pitch.

BY CHRISTOPHER KOCH

If every dog has its day, then corporate computing infrastructures around the world had theirs last fall, when America Online Inc. made its infamous switch to an all-you-can-download Internet access pricing scheme. The unsung heroes of infrastructure—routers, modems and servers—were suddenly elevated to stardom on the business pages of *The New York Times* and *The Wall Street Journal*, where AOL's busy-signal nightmares were reported in agonizing detail. AOL immediately began pouring millions into infrastructure improvements and even canceled a multimillion-dollar ad campaign to get enough money to pay for it all, but it was already too late. Angry customers didn't want to hear about modems and servers; they wanted service—and they took AOL to court in 38 states to get it.

PHOTO BY EDWARD SANTALONE



SCOTT DINSDALE keeps BMG executives focused on value, not technology, when selling infrastructure upgrades. He does it by breaking down the costs of providing computer access on a per-user, per-month basis.

Reader ROI

EVEN THOUGH YOUR COMPANY'S ABILITY to operate rests on the soundness of your infrastructure, persuading upper management that infrastructure investments are essential requires considerable salesmanship. This article explains:

- ▶ How to champion infrastructure improvements
- ▶ Why one company's decision to completely revamp its infrastructure every four years was a no-brainer

COVER STORY: INFRASTRUCTURE

If the AOL predicament sounds far removed from the concerns of the typical Fortune 500 company, consider this: AOL changed its business model without weighing the effects those changes would have on its computing infrastructure. Put in those terms, the company's travails begin to sound eerily familiar to IS executives in the corporate world.

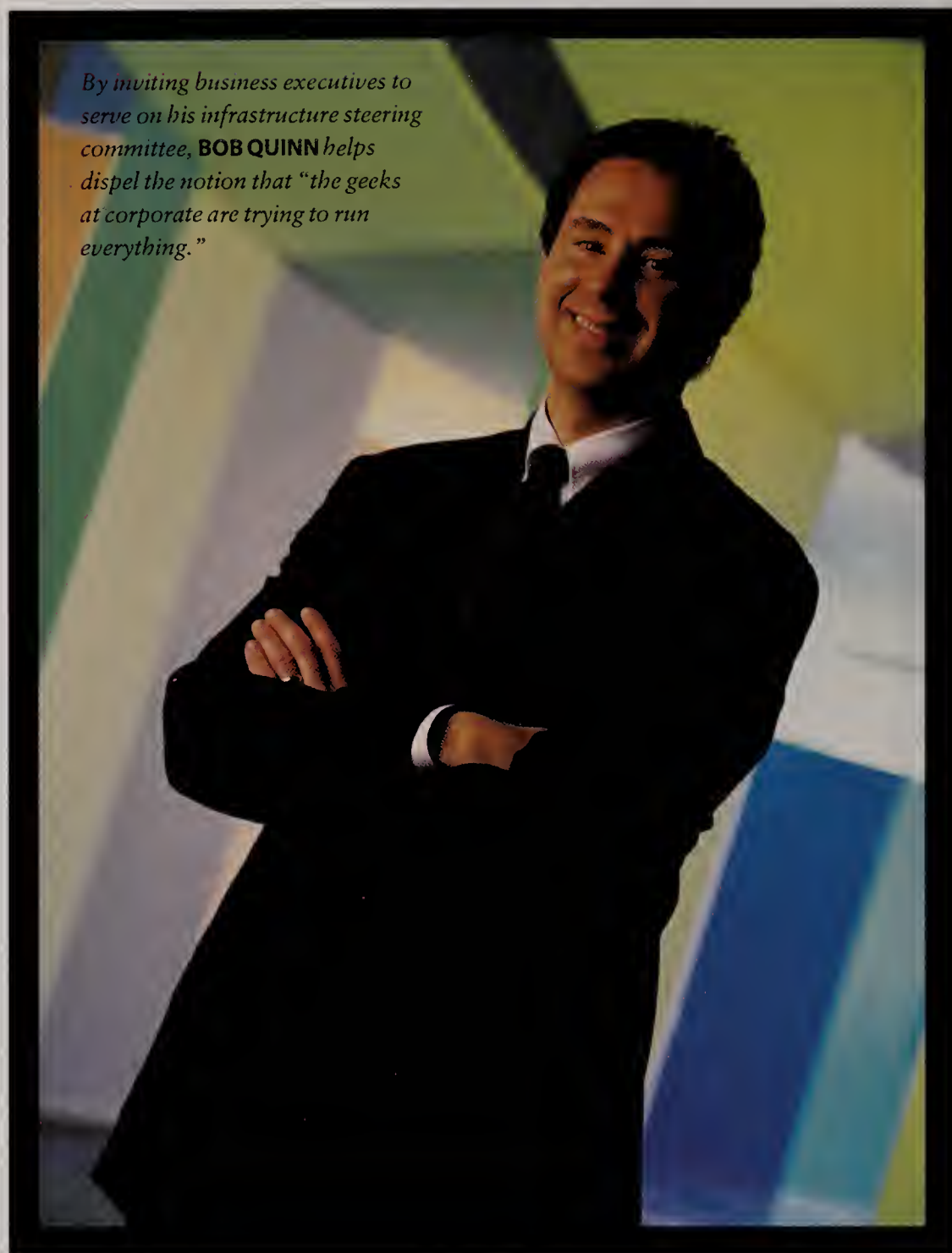
CIOs have had nightmares about this stuff for years. People like Gerry O'Connell, senior vice president of systems and CIO at the Chicago Board Options Exchange (CBOE), pinch themselves regularly to make sure they aren't dozing off into AOL land. "Capacity and availability are crucial to us," he says. "[Floor traders] can be real disagreeable if there's a problem."

Though most companies can tolerate a few minutes of network downtime now and again, the general trend is toward more infrastructure paranoia, not less. EDI, mobile computing, telecommuting, intranets, electronic commerce, videoconferencing—those strategies and technologies are usually linked to changes in the ways companies do business and interact with customers. If those changes put extra strain on the computing infrastructure, CIOs need to be ready to deal with it, or they risk being the next inductees into the infrastructure hall of shame.

Knowing what needs to be done is only one part of the challenge, however. Making the case for infrastructure improvements can be even more challenging than predicting future needs. Infrastructure is not something that demonstrates clear value to the business. It is at least two steps removed from customer interactions—it's the wire that

There's a general aura of bad karma around infrastructure: The stuff is invisible unless there's something wrong with it, in which case all hell breaks loose.

supports the applications that support the customer reps. There's also a general aura of bad karma around infrastructure: The stuff is invisible unless there's something wrong with it, in which case



*By inviting business executives to serve on his infrastructure steering committee, **BOB QUINN** helps dispel the notion that "the geeks at corporate are trying to run everything."*

all hell breaks loose. Put simply, if infrastructure were a product, no self-respecting salesperson would want to be stuck selling it.

But CIOs have no choice—infrastructure comes with the territory. And

Infrastructure discussions can be compelling—if they're linked to revenue opportunities.

"Based on my own very unscientific poll, when you start talking to IT people about what they're going to do next, they're usually focused on optimization: faster, cheaper, etc. It's a back-room mentality," says Ronald J. Tarro, director of the Vienna, Va.-based Navigating the New Technology Landscape program at Ernst & Young LLP. "There aren't many IT departments that will go into a budget meeting and say, 'We think we can create a new market using information technology.'"

If ideas for new markets don't appear magically in the days before a budget meeting, there are ways to use infrastructure to enhance the value of existing products and services. Lexus, a division of

most CIOs have proven strategies for "selling" it to the business. We've gathered a sampling of good ideas for selling the unsellable from CIOs, consultants and other infrastructure veterans.



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COVER STORY: INFRASTRUCTURE

Toyota Motor Sales U.S.A. Inc. in Torrance, Calif., for example, has in effect extended its dealers' LANs to customers'

company's entire computing infrastructure—as well as every desktop PC—every four years. The savings come

“Generally, the problem isn't with the specific infrastructure request; it's that IT hasn't set up an appropriate context to describe what the business is paying for the infrastructure now.”

—SCOTT DINSDALE

cars. A computer module is built into each car and gathers information between service visits. Technicians plug a car's module into the dealer's LAN and download information about the car's health. Customers value the service, even though they really don't want to know anything about how it works or what's behind it.

The same holds true for business people who are being asked to pay for infrastructure. “The link between revenue generation and infrastructure is usually a much more compelling argument than cost savings or avoidance,” says Tarro. “It's also easier to prove the link between revenue gains and infrastructure improvements than it is to prove a direct link to cost savings. The revenue gains are much more obvious and much more valued by the business. The CIO won't have to dig out the numbers and justify them.”

Decide what should be upgraded and what should be replaced, and be strategic about the choices.

“If you're a consultant these days, you'd better have a nice suit and the latest, greatest laptop,” says Jim Fluhart, Red Bank, N.J.-based executive director of advanced internetworking for Bellcore Professional Services. He served as infrastructure consultant to a consulting company recently and says the consultants “decided to stop buying laptops altogether and began leasing them for 14 to 18 months. The high-end machines don't lose much value over that time period, and the consultants are happy because they always have the best laptops out there.”

Indeed, some companies are taking the use-and-lose concept even further. At Ogden, Utah-based Thiokol Corp., producer of solid propulsion systems, CIO Brad Stout is committed to replacing the

mostly from reducing support costs and minimizing general angst. “Beyond the costs of supporting the old systems, there were the costs in terms of the relationship with my customer community,” says Stout, who is also vice president of information systems. “At any given

moment, we had hundreds of service issues we needed to deal with, and we couldn't keep up. We began to wonder, how can we upgrade the system so that it is more current, more reliable, more standard?” After crunching the numbers, Stout embarked upon a complex plan to “freeze the infrastructure” that will save Thiokol millions in support, maintenance and training costs (see “The Big Freeze,” Page 82).

Don't try to sell infrastructure incrementally; make it part of a strategic plan.

O'Connell sold an eight-figure client/server infrastructure upgrade to the board at the CBOE two years ago by presenting it as part of a five-year plan. First, he categorized the trading floor systems in simple business terms that reflected their importance in the trading process:



GERRY O'CONNELL sold a major infrastructure upgrade by presenting it as part of a five-year plan.

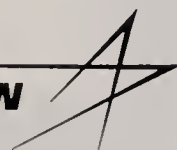
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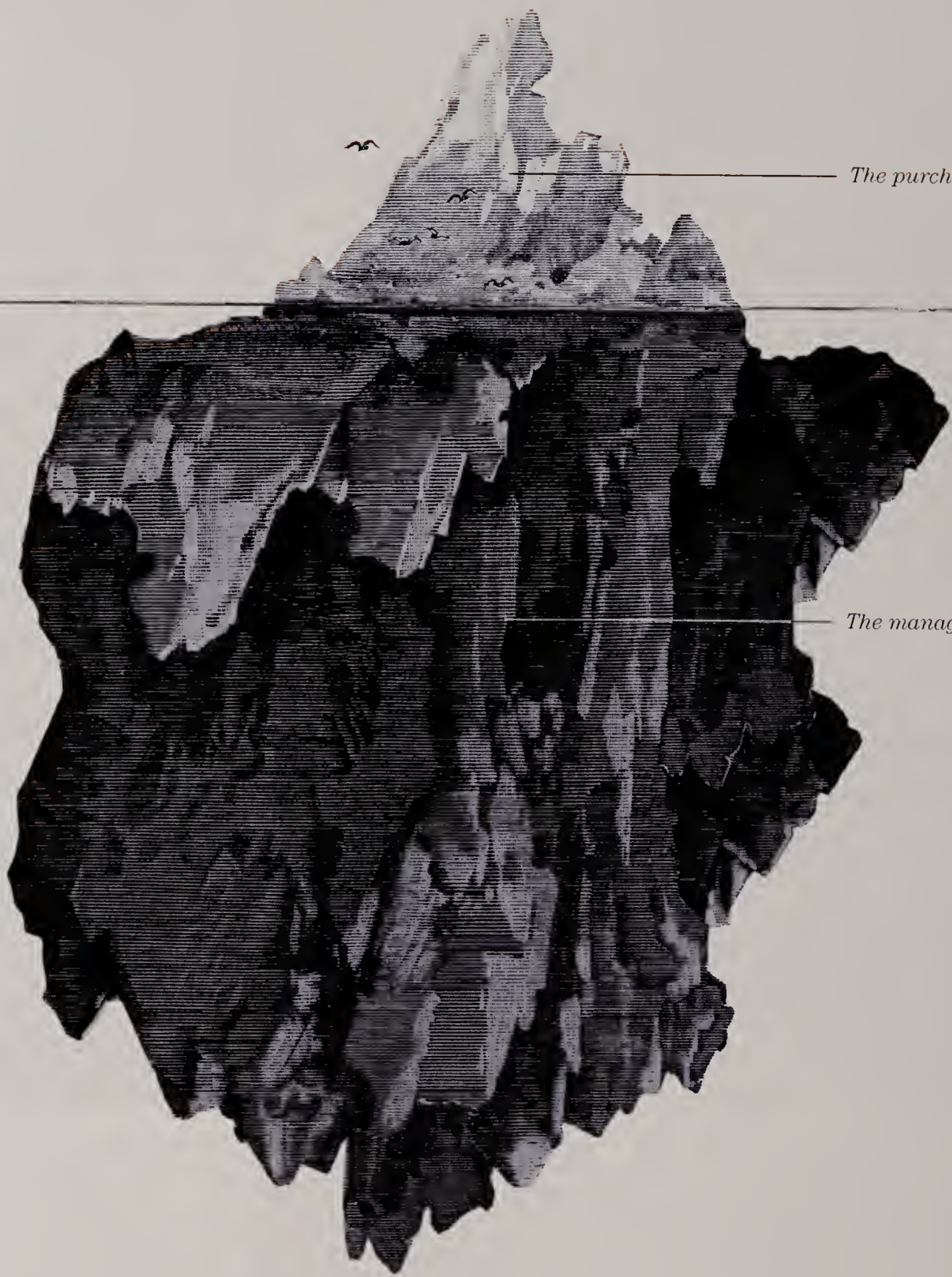


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market data systems, broadly defined, encompass all the places where brokers look for quotes and real-time price data (such as overhead boards and ticker crawls); order-based systems are the tools brokers use to take orders and move them around the exchange. O'Connell

then laid out a five-year plan for moving from a mainframe-based infrastructure to client/server. The scope of the plan is massive and calls for the creation of separate computing "zones" for each trading area on the floor, so a technology outage in one area won't take the rest of the

system down with it. To keep the business interested in long-term infrastructure upgrades, each year O'Connell sprinkles a few visible enhancements onto the trading floor like bread crumbs to remind everyone where the five-year plan is heading. He already has delivered

The BIG FREEZE

Talk about your moments

of truth. Brad Stout still recalls the day in December 1995 he walked into a meeting of Thiokol Corp.'s executive IS policy committee and told the chairman, CFO and executive vice president of HR and administration that he wanted to take the company's client/server computing infrastructure—everything from networks to the applications on the desktop PCs—and throw it all out the window. Getting support for the defenestration plan was the easy part; the committee already knew Thiokol's infrastructure was a scrambled mess of incompatible network and platform standards.

But Stout, who is vice president of information systems and CIO for Thiokol, didn't stop there. He told the assembled group that if they let him throw out the old stuff, he'd replace it all, top to bottom, with the latest and greatest—and the whole thing wouldn't cost the company a nickel.

Now if making a promise like that doesn't bring little beads of sweat to a CIO's forehead, it's hard to imagine what would. The clammy feeling gets worse when you consider the specifics. Thiokol, a producer of solid propulsion systems that builds, among other things, the solid rocket boosters for NASA's space shuttles, has six facilities spread out across Utah, Maryland, Alabama and Florida, including a 19,000-acre plant site in Promontory, Utah, where 3,500 employees are dispersed among hundreds of buildings.

But to hear him tell it, Stout could have done a deodorant commercial that day. He was calm because he had already spent nearly a year sweating the details of his plan. The core of Stout's strategy was what he calls "freezing the infrastructure." He calculated that if he could get all the business units in Thiokol to

Upgrading the infrastructure is so daunting a task that it might be easier to throw everything out and start from scratch.

At Thiokol, that course of action is not only easier—it's cheaper.

agree not to touch their PCs, networks or applications for four years, he could save millions in user training, support and maintenance—enough to pay for a brand-new truckload every four years. "We spent a year building financial models that showed what we would spend on infrastructure and support if we simply kept upgrading what we had versus starting fresh," he says. The numbers showed that Stout could expect a startling \$1 million savings over the first four-year cycle and an additional \$3 million over the second four-year cycle.

Even those numbers proved too conservative because Stout had underestimated the effect of the expectation factor. "We saved \$2 million the first year alone just by avoiding spending money on upgrades to things that were going to be replaced anyway," he says. Users were willing to put up with the four-year wait because they knew that the new PCs were going to show up as surely as Santa on Christmas Eve.

How did they know? "Intense politicking," sighs Stout. "We went to each business unit individually and showed them how this would lower costs to their bottom line and improve the lives of their people." Stout also made sure that the new package covered each business unit's needs well enough that they would feel comfortable with the four-year freeze. Rather than try to dictate the plan, Stout sat down with each business unit chief and negotiated PC desktop configurations for each individual employee. The only real variable in the equation was PC power—business unit chiefs could choose from a range of 133MHz Pentium machines all the way up to 200MHz Pentium Pros. Giving away the power control was a no-brainer for Stout

improved electronic market data boards to the pit and new handheld order-entry devices to the brokers. "I need to make the deliverables specific to the business, and I need to make them happen in much shorter intervals than five years," O'Connell says. "If the business starts

questioning the cost of the infrastructure, I can show them the plan that the board approved two years ago."

Make the business aware of what it's already paying for before you try to sell something new.

Selling a large piece of incremental infrastructure wouldn't be so difficult if the business had more context for its decision than the cost estimates for the proposed project. "Generally, the problem isn't with the specific infrastructure request; it's that IT hasn't set up an

because it had no effect on his effort to standardize the infrastructure from the ground up. No matter how many megahertz the business unit chiefs wanted, he could still buy all the PCs and servers from one manufacturer (Hewlett-Packard Co.), use a single standard network protocol and standardize the desktops on Microsoft Corp.'s Windows 95 and Office Suite products. (Engineers also received a powerful but standardized suite of drawing tools.) Though the negotiation process was long and arduous, in the end, the business unit chiefs were concerned less with the standards than with making sure their employees had the appropriate tools and the computing horsepower necessary to do their jobs. Stout's financial model includes an

BRAD STOUT *trashes Thiokol's infrastructure every four years—on purpose.*

across-the-board software upgrade after two years, as long as the existing hardware can accommodate the changes.

"One of the most critical aspects of the plan is that we all agree to live with it for a specified period of time," says Stout. "At that point, it becomes a top-down management issue to make sure abuses don't happen. That said, things have gone well because everyone has gained something. And as time passes, they know there is a set date when we will upgrade again, and that makes the wait more tolerable."

To replace 3,500 machines at once is no easy feat, however. To help carry out his plan, Stout approached the job as a developer approaches the construction of a new house. With his staff as project leaders, he hired a local systems integrator to act as general contractor for the project, making sure things happened when they were supposed to. The integrator in turn hired four subcontractors: a capital leasing company that will retain ownership of the infrastructure when the four-year period is over, a software training company to bring users up to speed, a reseller to take away the old stuff and a computer hardware vendor to organize and deliver the new stuff. Stout pays the capital leasing company a monthly per-user fee that is determined on the user's particular software/hardware configuration. The seven-month transition period began in late August 1996; by the end of March, all of the new equipment was in place, according to Stout.

Stout is now considering bringing the freeze model to other areas of the company to cool users' anger and frustration with old mainframe systems. Despite all his creative planning and financial juggling, however, Stout says top management wasn't as impressed with the replacement effort itself as they were with what went on behind the scenes to make it happen. "What impressed them," he says, laughing, "is that we were able to get everyone in the company to agree to it."

—C. Koch



PHOTO BY KENT HANSON

appropriate context to describe what the business is paying for the infrastructure now," says Scott Dinsdale, CIO of BMG Entertainment in New York, the \$5.8 billion entertainment division of Bertelsmann AG, the world's third-largest media company. Dinsdale breaks down the costs of providing computer access on a per-user, per-month basis so that when he goes to BMG's executive committee to sell an infrastructure upgrade, he can tell them what new services or improvements the upgrade will provide and how much more—or less—it will cost per user. "It allows you to have a dialogue with the business that's based on value rather than on technology," Dinsdale says. "The decision becomes not 'Should I pay for this?' but rather 'Am I getting a fair price for this?'"

One of the drawbacks to the per-user cost formula, however, is that it can shift cost burdens unfairly. At SunService, a division of Sun Microsystems Inc., Vice President of Information Resources Bob Quinn doesn't just break down the per-user cost according to such standard measures as network usage and desktop configuration. Because Sun has offices around the world, he also must take into account the local issues that affect costs.

For example, in Shanghai, network access is much more expensive than it is at Sun's Silicon Valley headquarters. Quinn jiggers the numbers so that the Shanghai office isn't unfairly penalized

impact as well. "The point of the chargeback system is to get them to see that if they hire someone or want a new network, they will see the impact on the bottom line," says Quinn. "That drives

"Everyone understands why you have the people with the badges downstairs. So when you show them the millions you're spending for physical security, suddenly \$500,000 for network security doesn't seem so bad."

—SCOTT DINSDALE

for these higher costs. "You have to make sure the chargeback tracks to the things the business can control," he says.

There's no doubt the leaders of Sun's many business units control their P&L statements. Quinn's infrastructure numbers appear on all those P&Ls, which means he's been getting a lot of calls lately asking what a PBX is and why it will cost \$10 million to make it better. And because the P&L plays a large role in Sun's bonus compensation scheme, the infrastructure numbers have a personal

them to take part in the decision to upgrade the PBX because they see that it isn't free to them."

Use metaphors and analogies for infrastructure.

Dinsdale predicts that network security is going to be the next bit of incremental infrastructure that CIOs will struggle to define and justify to the business. Network security is about as easy to explain as quantum mechanics, so he uses metaphors to highlight its importance to the business and to create context for its cost relative to other services. "Everyone understands why you have the people with the badges downstairs," he says. "So when you show them the millions you're spending for physical security, suddenly \$500,000 for network security doesn't seem so bad."

Save money somewhere else to "pay" for infrastructure improvements.

Two years ago, Dinsdale was trying to find the money necessary to make a long-overdue upgrade to BMG's computer network. "There was no way to make the upgrade a zero-sum game," he recalls. "I couldn't just rip everything out and replace it and have [the cost-efficiencies] cover the costs."

So Dinsdale went to his sister companies in the Bertelsmann empire and negotiated a deal for all the companies to share a voice network. "We wrapped up the telco negotiations in September of '95," he says. "In October, I walked into the budget meeting with the network plan in one hand and an accounting of the millions we were saving in

Infrastructure: WHAT'S AHEAD

THE PUNDITS AGREE that the next major infrastructure challenge (besides the Internet, of course) will be mobility—providing salespeople on the road and telecommuters at home with what Framingham, Mass.-based International Data Corp. calls "secure yet transparent access to all distributed applications and services" on the corporate network. Sales of central server facilities for supporting remote access computing solutions will rise to \$1.6 billion in 2000 from \$196 million in 1995, predicts IDC, which is owned by CIO's parent company, International Data Group.

Wireless technology is advancing to the point where the "wireless local loop" will become an economically viable substitute for the copper wires that connect the computer network to the local telephone company, predicts Jim Fluhart, executive director of advanced internetworking for Bellcore Professional Services. In companies where employees are always moving—such as a hospital, for example—a wireless local loop could allow CIOs to integrate pagers, cellular phones and PCs together onto a single network—perhaps even a single device.

—C. Koch



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BRAD STOUT proved that selling infrastructure isn't rocket science—as long as you've done your homework.

telephone service in the other.” Dinsdale got the money for the new wires.

Take technology out of the discussion and subdivide infrastructure into components that mean something to business people.

Don't ever lead with the infrastructure technologies, counsels Ernst & Young's Tarro. Instead, begin by tying the project to a particular outcome that's valuable to the organization, such as the new revenue that will come out of having a world-class order entry system, for example. Then outline the business capabilities necessary to achieve that business outcome (such as answering all of the customer's questions in one phone call). Finally, describe the technologies that will provide new order entry capabilities (like a new data warehouse and improved call-center applications) and the infrastructure needed to support them.

For the infrastructure categories that

are moving too quickly for such a linear approach—such as the Internet, for example—Tarro recommends selling infrastructure the way brokers sell stock options. “The CIO says to the business,

“CIOs can no longer afford to say, ‘Trust me, I’m managing the infrastructure.’ The numbers have simply gotten too big.” —BOB QUINN

‘If you want to be able to do marketing on the Web somewhere down the road, we need to upgrade the network now,’” says Tarro. “It’s like saying, ‘We’re buying an option to do Web marketing.’” Wise companies have a portfolio of those options to increase the odds of staying current. If the business asks about ROI, say that there is none. After all, says Tarro, stock options don’t have guaranteed returns.

Find a business ally to help sell the new infrastructure.

Infrastructure is becoming too important to the company's survival to leave the decisions up to the IS department alone. “CIOs can no longer afford to say, ‘Trust me, I’m managing the infrastructure.’ The numbers have simply gotten too big,” says SunService's Quinn. “You have to create a deal with the business and say, ‘Look, this is a big number and it’s your money, so you have to invest some time in managing this.’”

Create an infrastructure steering committee to involve the business in infrastructure decisions.

Quinn spent the better part of a year cajoling executives from Sun business units to join his infrastructure steering committee. Support came slowly because Sun is highly decentralized and each unit has its own perspective on the relative importance of IT. But Quinn realized that the committee was crucial if the charge-back system was to be successful because it would make his central IS organization seem less domineering. The committee also gives Quinn an opportunity to appease parts of the organization that tend to view corporate IS with distrust, such as the field offices. “We don’t want to make it seem to the field offices that the geeks at corporate are trying to run everything,” says Quinn.

To emphasize the local voice in infrastructure decisions, Quinn pushes the members of the committee to put their names on individual infrastructure proj-

ects. “People accept changes better if there’s someone in each organization communicating that we’ve decided to make the changes,” he explains. “The committee members have to take some responsibility for making the project happen, but they wind up looking like heroes to their people.” **CIO**

Senior Editor Christopher Koch can be reached at ckoch@cio.com.

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The¹ data game

Companies are learning how to turn customer information into product—and profit. CIOs need to help call the plays.

BY DEREK SLATER



**Turning
Data into
Dollars**
part one

PLENTY OF CREDIT CARD PROVIDERS POPPED UP IN THE EARLY '80s, but all the cards looked roughly the same: 18 percent interest, a 25-day grace period to pay off new charges, an annual fee of about \$25.

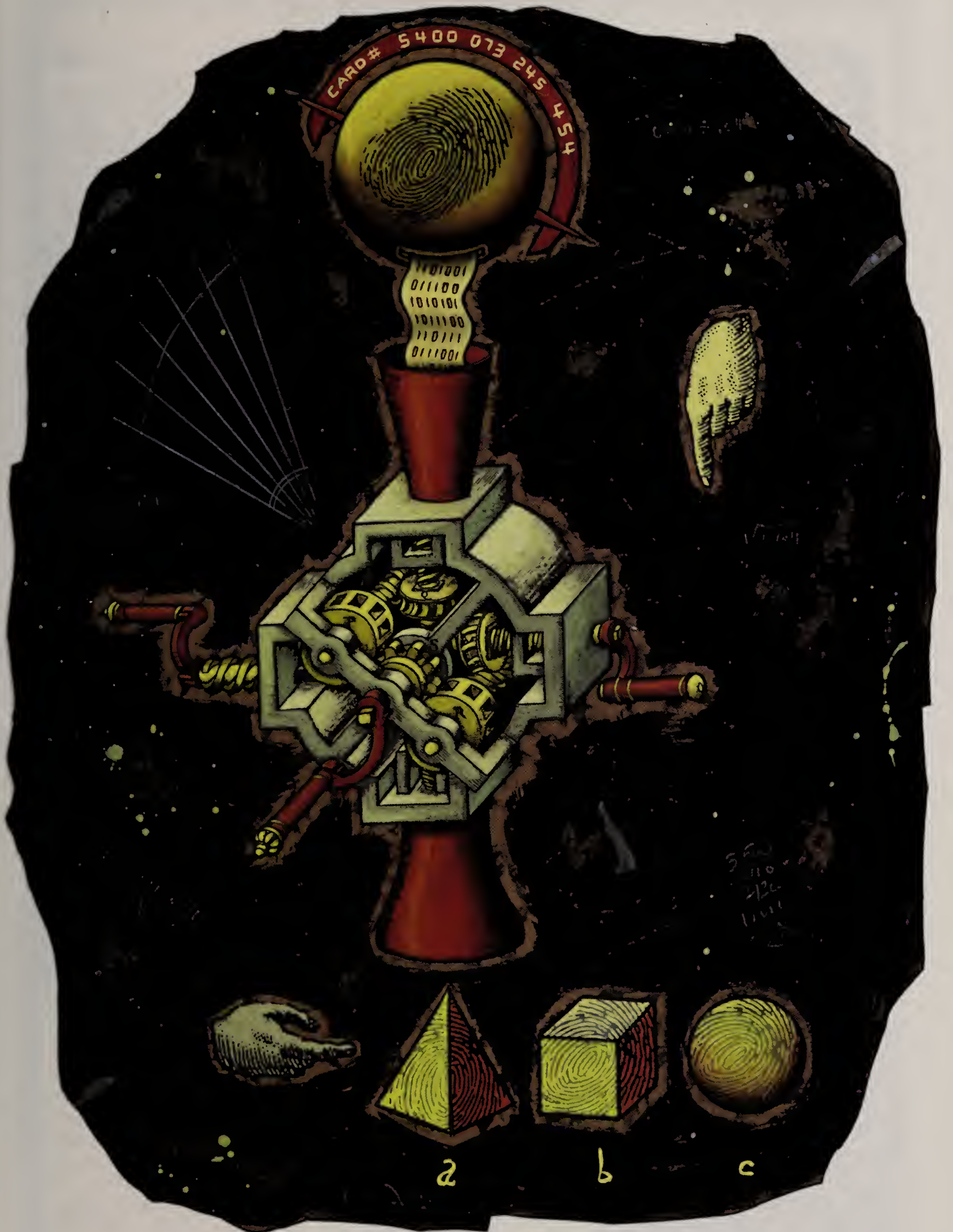
For card providers like Capital One Bank, the good cardholders, who faithfully ponied up their payments, were effectively underwriting the bad customers, whose defaults totaled about 7 percent of each dollar the company loaned.

But in 1988, top executives at Capital One had an epiphany: Their business could be about more than just extending credit. "[We realized] that the credit card business was not just a finance activity but an information-based activity about customers," says

Turning Data into Dollars

Part One of this series takes a look at the term "information exhaust" and what it means for companies looking to turn their data into new products.

Part Two, "Up Close and Personal," coming in our May 15 issue, examines the pitfalls companies can fall into when they violate customers' privacy by selling data.





Turning Data into Dollars *part one*

Jim Donehey, senior vice president and CIO of Capital One. The company started maintaining transaction records and searching various market segments to identify "perfect customers"—those who use the cards and carry a balance but pay bills faithfully, says Donehey. The strategy was simple: Offer better terms to consumers in those segments, draw in better customers and thus decrease the percentage of bad loans. "By focusing on the people who had good credit, we could waive the annual fee and increase our overall margin while actually reducing the cost to the customer," says Donehey.

Today, Capital One offers more than 3,000 different credit card products customized to the needs of 8.2 million customers.

Prior to its enlightenment, Capital One—like many other companies in many other industries—held little regard for leftover customer and transactional records. Consultant Stan Davis has dubbed that data "information exhaust" because reams of such information escape every corporation, a supposedly useless byproduct of the information age. But more and more companies are learning that information about customers past, present or potential is a potent source of value.

Donehey and others say the CIO must play a key role in turning dross into gold, data into dollars. To do so, the CIO has to understand the company's business, the data itself and its many possible uses in the marketplace. That understanding puts the IS executive in a position to make a direct impact on the corporate bottom line—particularly gratifying because that's not the

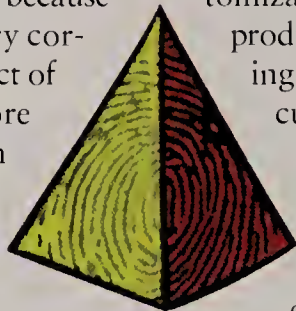
reputation IS carries. "IT folks don't tend to be the sources of inspiration in crafting new initiatives [that turn customer information into products]," says Randall H. Russell, a senior manager at the Ernst & Young LLP Center for Business Innovation in Boston, who has written extensively about the value of customer data.

Opportunities Inside, Outside

USES OF INFORMATION EXHAUST VARY BUT CAN BE lumped into a few general areas. Most companies keep their data to themselves and use it to customize their products or to target their marketing efforts more accurately. Some other brave souls are making their data available in one form or another to outsiders.

Capital One's story is an example of mass customization, tailoring products to meet the exact needs and promises of each customer. Mass customization might be defined as finding the right product for your customer, for example, tweaking interest rates and credit lines to please a customer and still make money. As Russell says, a company pursuing a mass-customization strategy breaks down its products to the smallest possible units that can be mass produced and then cultivates its expertise in putting those pieces together in the right combination to meet the individual needs of the customer.

Targeted marketing is, in some respects, the converse of mass customization: finding the right customer for an existing product or service. Taken to the extreme, it means one-to-one marketing, know-



Catching Data In Your Web

*Internet tools are ripe for
information gathering*

INFORMATION EXHAUST IS A CASE OF THE haves and the have-nots.

Financial and utility companies have the advantage of owning transactional data. Other industries, such as consumer goods manufacturers, may be insulated from their customers by links in the distribution chain. "Retailers have always tried to own the end customer. 'They're my customer; they're coming into my store,'" says Don Hinman, vice president of Acxiom Corp.,

one of the so-called "infomediaries" that deals in bartering data. Feeding customer ID information back to the manufacturer creates some risk that the retailer will be bypassed in future sales.

If you don't already have information exhaust sitting around, there are ways to get it. Manufacturers have tried various tactics to reach customers directly, such as including registration cards or another survey form in the packaging. Hinman notes that such a process provides only a sample of buyers, not a complete census—but it's a start.

The Web is emerging as a source of customer data for some companies that can use a variety of technologies (for example, "cookies," which track a Web surfer's movements from page to page) and tactics such as surveys to get a handle on who is surfing their sites. For

corporations whose products exist outside the virtual world, data drawn from the Web likely will be valuable in the short term but will still represent just another sampling of the buying populace. On the other hand, the Web already has created a new wave of infomediaries such as DoubleClick, whose sole sustenance comes from cyberspace.

Successes such as those have spawned no shortage of heady prophecies about the Web's potential as a source of customer data. "The first companies that do this are going to mint money," says Manish Acharya, director of marketing for data warehousing vendor MicroStrategy Inc. in Vienna, Va. "The Web is like a printing press."

—D. Slater



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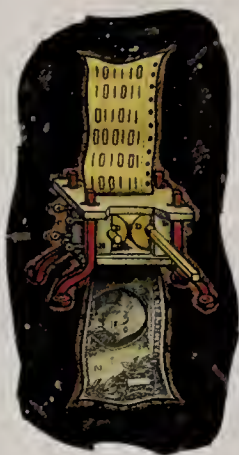
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Turning Data into Dollars *part one*

ing each individual customer's preferences and presenting him with only those offers he is most likely to pursue. London-based online supermarket chain Tesco PLC, for example, uses preferences indicated by members of its frequent-shopper card program to inform its coupon mailings. For example, a vegetarian has no use for "meat vouchers" and conceivably might be offended if she received them in the mail; Tesco's database dictates that the coupon envelope mailed to a vegetarian won't include such vouchers, says company press officer Danielle Byrne.

Supermarkets are collecting many terabytes of customer-purchasing data through affinity memberships. Tesco has 9.5 million members who shop once or twice a week on average, yielding "massive, massive amounts of data," says Byrne. It seems a bit naive to think grocers are exerting such efforts only for the sake of minor tweaks to their direct mail campaigns. But even at that, it's clear the business that can target potential buyers more accurately, lowering marketing costs while simultaneously increasing returns, has a leg (and an arm) up on the competition. "You can't market unless you understand who your customers are," says Aaron Zornes, a Burlingame, Calif.-based executive vice president and director at consultancy Meta Group Inc.

Information exhaust needn't be limited to internal uses. MasterCard International Inc. is pursuing a different path: making data available to its member banks in order to add value to MasterCard's product offerings and win member loyalty. The company does not offer credit cards; its customers are banks that provide the cards under the MasterCard brand. MasterCard's data warehouse



helps its member banks identify the behaviors of various consumer segments. (For example: "Dual-income urban dwellers spend heavily on entertainment, meals and travel.") The banks in turn use the data for marketing purposes, often by marrying it to data from other sources, says Anne Grim, senior vice president of global information services for MasterCard in Purchase, N.Y. MasterCard's member banks typically have the same data already in their possession but don't store it in a way that is easy to access and understand, Grim says. In many cases, MasterCard must work closely with external member banks to make sure they can get the maximum value from data. That assistance gives the banks a boost and in turn makes MasterCard a more attractive business partner.

Similarly, providing individual customers with

a better view into their own purchasing habits can be an enticement to buy. A simple example is Federal Express's package-tracking information database. "The whole idea of letting the external world access your internal database is customer service," says Zornes.

Perhaps the most obvious way to turn data into money, though, is simply to sell it. According to the "infomediaries," companies that deal solely in bartering information, the appetite for data of all sorts is growing dramatically. "We're seeing a much wider set of industries using our data," says Don Miller, vice president of technology development and operations for Experian Information Solutions Inc. (formerly the credit reporting arm of TRW) in Orange, Calif. Experian has plenty to work with: The company's largest database has about 8 billion rows and records as many as 60 million updates each day.

*"Letting the external
world access your
internal database
is customer service."*

—Aaron Zornes

As more businesses and consumers become buyers of data, the field widens for more sellers. Merck-Medco Managed Care LLC is a health-care company cashing in on the demand for data. The Montvale, N.J.-based company started as a claims processor for the insurance industry. However, the claims records have yielded trend data that pharmaceutical companies, for instance, now purchase to examine the effectiveness of prescribed treatments. Quest Informatics is another data services company from the health-care industry. The Rutherford, N.J., company collects and analyzes clinical laboratory data that comes from a variety of sources including its sister company, Cambridge, Mass.-based Quest Diagnostics Inc., which does lab work for physicians nationwide. Quest Informatics produces "actionable" clinical and strategic information for purchase while still maintaining patient confidentiality, according to Brian Griffin, manager of product operations for the company.

Mind Your Own Business

INITIATIVES TURNING DATA INTO PRODUCTS MUST originate with a solid understanding of corporate goals. If ever there were an area that demands that an IS department be in tune with business objectives, this is it. The job requires more than throwing data into a warehouse and doing a little data mining, say the CIOs who already are exploring the possibilities of information exhaust. "The CIO is changing from a technology role to a technology-business integrator," says MasterCard's Grim.

Grim says the IS organization that builds a data warehouse, tosses the keys to the marketing group and washes its collective hands is simply wrong-headed; much of the potential value of the data will



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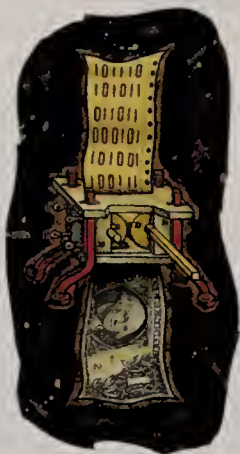
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Turning Data into Dollars part one

be lost. People on the marketing side of the fence typically feel removed from the process of capturing customer data. The situation requires the IS group to form partnerships within the company and get all hands involved.

"If the IT people have a foot in the business camp and understand what the business objectives are, they can play a leading role in demonstrating how information can be used," says Grim.

Capital One's Donehey says part of his role as CIO is to expose business people continually to new technologies.

Knowing the possibilities offered by state-of-the-art computing, the CIO can foster a what-if mind-set in other business areas.

"Once you've got their imagination cooking, you've made tremendous strides," says Donehey. That's quite a role reversal for the IS function, which in the days of long, inflexible project development cycles was more likely to kill such thinking than inspire it.

cesses data primarily for financial companies.

Sometimes customer data doesn't take on significance unless it is tracked over long periods of time. Trends are valuable. For example, Capital

One tracks variables that can indicate how likely a customer is to default. "You have to do it over a long period of time; you have to keep a lot of information for a long time to find the trends you are looking for," Donehey says.

Dirty data is another issue. Customers move, change names and pay with different means. A simple typographical

error by an order taker can create inconsistencies that are hard to spot and correct. Software tools from companies such as Vality Technology can help straighten out messy data; CIOs can build skills into the IS organization for managing those issues or they can choose to outsource modeling and cleaning chores. "Data contamination is not an insurmountable problem," says Manish Acharya, director of marketing for data warehouse vendor MicroStrategy Inc. in Vienna, Va. "With this kind of money at stake, people will invest what's necessary to get their data clean."

CIOs also need to watch out for a few yawning pitfalls that await the unwary company that offers up customer data for sale at the individual level. Customer privacy is one issue, particularly in sensitive industries such as health care and finance. (See "Up Close and Personal" in the upcoming May 15 issue of *CIO*.) Another is the risk of letting the corporate customer list fall into the wrong hands.

List-brokering companies have developed standard practices for managing list usage, according to Don Hinman, vice president of Acxiom Corp. Those practices include examining each potential customer's intended use of the data and seeding the lists with "decoy names" that show if the list is being misused.

Each company must weigh the risks against the rewards. By all accounts, you have to start somewhere. "If customer information is as important as we think it is, a CIO not running a customer service application may have a problem," says Jeffrey F. Rayport, an assistant professor in the Service Management Group at the Harvard Business School. "Most companies are going to have a hard time figuring out what consumers want and how to customize products for them if they don't figure out how to collect and exploit the value of that information," he says. **CIO**

Staff Writer Derek Slater can be reached at dslater@cio.com.

Further Reading

"Information Value from Mass Customization" and "Information Value from Knowledge-Based Products and Services," papers by Randall H. Russell of Ernst & Young's Center for Business Innovation.

2020 Vision, Stan Davis and Bill Davidson, Fireside, 1992.

The Four Faces of Mass Customization, by James Gilmore and B. Joseph Pine, Harvard Business Review, January 1997.

The Coming Battle for Customer Information, by John Hagel III and Jeffrey F. Rayport, Harvard Business Review, January 1997.

Know the Data

AT THE SAME TIME, THERE ARE SOME skills that IS alone brings to the party. The CIO has an intimate understanding of the data that is at the company's disposal. Often that data derives its value from being correlated with information from another area of the business or an outside source. If that's being done in a data warehouse, typically there are challenges associated with modeling the data correctly and flexibly enough. "You can never underestimate the magnitude of effort involved in integrating disparate data sources," says Larry McAferty, CIO at Source Informatics, a health-care information provider in Phoenix. Source Informatics is among the so-called infomediaries whose business is based entirely on data: They take data in from outside sources; process, package and analyze it; and either sell it back to the original source or find new markets.

Data modeling and analysis are core competencies for infomediaries. While the average corporate IS shop may have to play catch-up, most are making progress. "In general, legacy systems are getting better, and order-entry shops are using better controls [to make sure data is accurate]," says Ken Rapp, president of DynaMark, a 300-employee data service bureau in Arden Hills, Minn., that pro-



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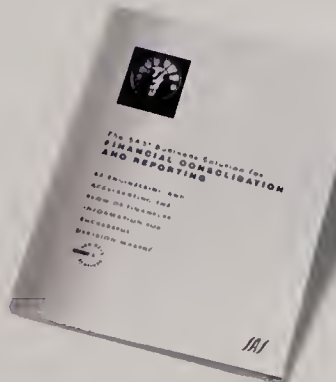
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PROFILE: WESTINGHOUSE

Frank Dittrich
*is powering up a single
desktop standard at
Westinghouse.*

A Powerhouse Lightens Up

Westinghouse Electric needed a new computing infrastructure—and fast—before the lights went out. But first, IS had to fix itself.

BY TRACY MAYOR

In 1994, Westinghouse Electric Corp. had a big computing problem.

Twenty-nine separate information systems fiefdoms spread across seven business units were attempting, with ever-diminishing success, to maintain control over a tangle of computing systems.

Reader ROI

WESTINGHOUSE ELECTRIC CORP. PUT ITS TECHNOLOGY organization into virtual receivership for two years and lived to tell the tale. Learn how the company

- ▶ Built a streamlined, cost-effective technology hub
- ▶ Downsized its technical workforce
- ▶ Chose an end-to-end computing platform for the next four to six years
- ▶ Became flexible when its ideal plan confronted reality

A desktop machine might run Unix or OS/2 or Windows for Workgroups or Windows 3.1 or DOS. No fewer than eight separate messaging systems, including Lotus Notes, IBM PROFS, DEC All-in-One and cc:Mail, were operating. The company supported several word processors, multiple spreadsheets, myriad databases and, on the connectivity

PHOTOGRAPHY BY HARRY GIGLIO

PROFILE: WESTINGHOUSE

front, at least four unrelated networking protocols.

"We were on a variety of file servers and they were at different release levels," says Frank Dittrich, CIO of the Pittsburgh-based company since June 1996. "The infrastructure was very hard to operate on a day-to-day basis, and it didn't support key objectives of the business such as implementing SAP finance."

Westinghouse was struggling to make its business practices more competitive even as it grappled with management structures left over from the 1970s. IS management was every bit as decentralized and ineffective as the computing infrastructure it was trying to control. A small, cloistered corporate data center presided in name only over far-flung IS departments. The CIO, who served corporate headquarters only, could recommend desktop and network standards but had no authority to enforce those guidelines with individual IS managers in the various divisions.

"If you asked an IS manager if his department was a mess, he'd say no. The next IS manager felt that [his department] was under control too, except that he [worked with] a completely different set of tools and systems and software," recalls Vince Benkovich, director of industry and technology information systems, a 23-year Westinghouse veteran who was given the responsibility for

managing the changes to come at Westinghouse. "As long as you were communicating only in your own space, the world seemed fine."

Problems, Problems, Problems

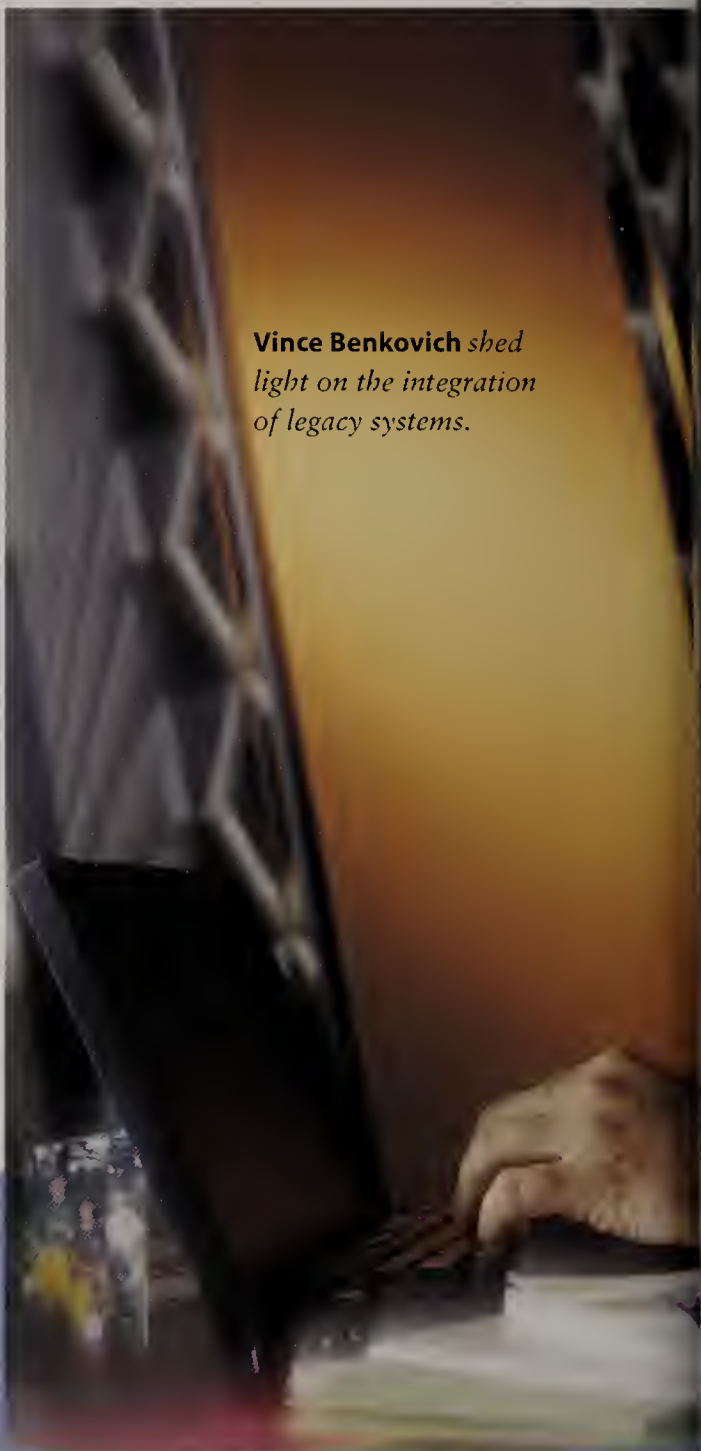
The multiple platforms, applications and networks created some productivity-busting difficulties. "We didn't have common back-office tools, so we were speaking different languages," says Dittrich. "The chairman couldn't even send a global e-mail message to the troops."

Workers were using such a wide variety of desktop applications that common office tasks such as sharing PC attachments turned into major problems. "If somebody wanted a document, I had to copy it onto a floppy. Now I just download a file to them, and I know they're going to be able to open the document," says Conrad Acker, senior marketing communications specialist in Westinghouse's process control division in O'Hara Township, a suburb of Pittsburgh. "The network was always crashing. Your machine would just freeze. Now the reliability is an order of magnitude better."

Despite all the process concerns, Dittrich and other managers emphasize Westinghouse's principal concern was cash. "A lot of [the problem] just hinged frankly on the number of people in IT. It was as high as 1,500," says Dittrich.

Support costs in particular were troubling; one estimate had 75 percent of the IS staff working simply to keep the diverse systems up and running.

The costs remained hidden in multiple departments' bottom lines until a



Vince Benkovich shed light on the integration of legacy systems.

Reality Settles In

Inheriting a plan based on ideals is one thing; making it work is another

SINCE JUNE 1996, WHEN FRANK Dittrich became CIO of Westinghouse Electric Corp. in Pittsburgh, he and other senior technology managers have faced the challenge of determining how to apply the Strategic Information Technology Initiative's (SITI) vision of "one desktop, one architecture" in a way that makes sense fiscally as well as operationally. After running IS for nearly two years, The Feld Group left Westinghouse in November 1996. "The

SITI project is a sturdy foundation that's fairly pristine," Dittrich says. "In fact, it's overly clean. One of the things we're doing since Feld left is settling it out a little bit."

The IS team is still fully committed to the hardware, software and organizational changes called for in the plan, but such changes will come at a slower pace. "We're putting SITI in balance against what the new Westinghouse Electric Co. needs," Dittrich explains. "[In terms of] the major objectives that Feld set out, we're still on target."

By extending the project's time frame, Westinghouse will be able to reap the cost-saving benefits of SITI without immediately having to remove still-functional PCs or an adequate copy of Windows 95 from a user's desk before it

has reached the end of its natural technological life. "Can I support a narrower [application] set than I had before? Sure, but let's take a more pragmatic approach by setting a longer-term vision," says Dittrich. "Feld wanted to go from very broad in '94 to very narrow in '97. I've just extended their time line."

As a result, Westinghouse isn't installing Windows NT Workstation on every desktop right away. Some machines will run Windows 95 for the time being. "We'll get to NT Workstation,

"We were speaking different languages. The chairman couldn't even send a global e-mail message to the troops."

—Frank Dittrich



top-management overhaul in 1993 brought in a new chairman and, early in 1994, a new CFO, Fred Reynolds. As part of an overall business audit, Reynolds' staff for the first time calculated IS costs from each individual business unit. That number gave everyone pause. "When you totaled up information systems costs at the corporate level, which was very difficult to extract, it looked like a very large number," says Benkovich. According to Dittrich, Westinghouse spent \$250 million on information technology in 1994.

In early summer 1994, Reynolds turned to The Feld Group, a Dallas-based consultancy specializing in information technology strategy that also fills in for and recruits senior IS managers. Feld employees directed IS at Westinghouse for just under two years, until Dittrich arrived in the summer of 1996; its consultants conducted an initial study that revealed the level of both technical and managerial inefficiencies and, with Westinghouse senior management's approval, set to work on this three-pronged strategy:

- Develop an architecture that will cut costs and meet business requirements for the next five years;
- Reorganize the managerial structure of information systems;
- Hire a new CIO.

Thus was born SITI, or the Strategic Information Technology Initiative, a plan for Westinghouse to build a common, centrally managed system of tightly integrated networks—file and print servers running standard interoperable messaging and desktop applications; on the organizational side, the plan called for an empowered central technology division responsible for making all infrastructure decisions and creating a centralized help desk for the whole company.

Solutions, Solutions, Solutions

From the outset, The Feld Group focused most intensely on the nuts and bolts of the infrastructure. "We really couldn't get after anything else without fixing the plumbing first," says Bruce Graham, a consultant with The Feld Group who served as director of IT services at Westinghouse during the two-year span. The Feld team also concluded that the fastest way to reduce support costs was to cut back the huge number of desktop applications, operating systems and network protocols as much as possible. Westinghouse would then be able to reduce support personnel, take advan-

but we'll do it as we're making investments for other reasons, not just for the sake of having one standard desktop," says Dittrich. Every new machine that comes online will be able to run NT, so eventually there will be just one desktop operating system, as per the plan.

And for all its enthusiasm, Westinghouse isn't marching in lock step with Microsoft on every front. The company has a significant investment in Lotus Notes, for example, and that relationship will continue, though with modifications. People will continue to

use Notes where appropriate for groupware applications and particular kinds of messaging. But having Exchange available as an alternative, Dittrich says, allows Westinghouse to determine which is the best software for a particular need. On the hardware side, not every machine needs to be of the Pentium class immediately, he adds. For spreadsheet, word processing, e-mail and light database use, a 486 class machine will suffice for now, provided it can run at least Windows 95.

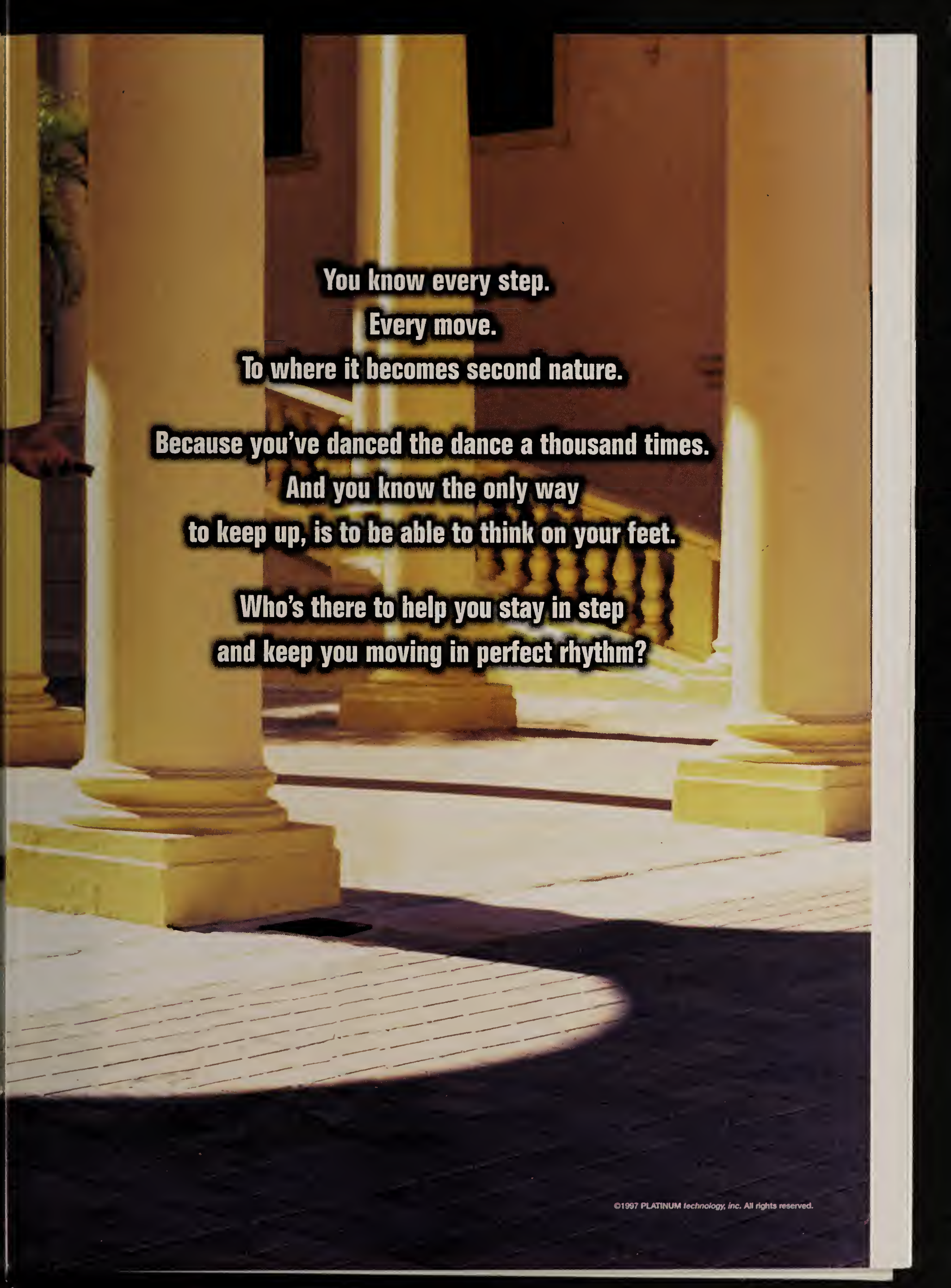
Management isn't concerned that supporting two operating systems rather than one will strain the new support structure. "It does broaden the footprint a bit, supportwise, to run both Windows 95 and NT," says Vince Benkovich, director of industry and

technology information systems, "but it's not much more difficult to support both." And because Westinghouse fully intends to upgrade to SITI-specified standards as machines and applications reach their limits, "time will heal the problem," he says.

Implementing SITI at a slightly slower pace may have a psychological benefit as well. IS employees, particularly those who have been with the company a long time, weren't entirely at ease with the drastic nature of the SITI plan, says Dittrich: "They think, 'Why did we remove that 486 66 [MHz PC] for an individual who really only does mail and some word processing?' Most people here are [Westinghouse] shareholders. They don't want us to waste their money."

—T. Mayor





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PROFILE: WESTINGHOUSE



Bruce Graham
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transition
period.

tage of volume procurements and boost employee productivity.

Westinghouse settled on its vendors with lightning speed: IBM and Microsoft were on board just one month after Feld presented the broad outline of SITI to the chairman's council in November 1995.

Since volume procurement was one of the leading goals of SITI, says Graham, the team from the outset sought the widest range of products with the highest degree of integration from the fewest number of vendors. Back-office functionality was deemed more important than applications. Desktop applications weren't a first priority, because most office suites offer nearly identical functionality in their business programs, Graham says. Acker agrees: "Whether it's Microsoft or WordPerfect, I don't have a preference, as long as I have something that works." Before SITI began, in fact, Acker switched from WordPerfect to Microsoft Word on his own initiative to share files more easily with outside contacts.

Was Westinghouse foolhardy to select Microsoft as its top-to-bottom software provider rather than test each component against its individual competitors? Dittrich, who came on board a year after

the initiative began, says no. "I don't think the decision was a follow-the-leader thing," he says. "You can narrow products down to a few choices fast." On the server, for example, Westinghouse had a choice of OS/2, NetWare or NT Server. NT Server simply beat out the competition. "It takes more NetWare servers than it takes NT servers to do what we want to do," Dittrich says. And when ease of administration is a key objective, the degree of integration among products is as important as the individual performance of each. Achieving compatibility between elements such as network adapters and device drivers can cost companies "a lot of overhead," Dittrich says. Such problems are virtually nonexistent when buying from a single vendor.

Settling on IBM for hardware and Microsoft for software eliminated the need to make a lot of subsequent decisions. "When you say, 'I'm going to pick Microsoft BackOffice,' that moves you into a second set of easier decisions," says Benkovich. In addition, for a company with Westinghouse's clout, he says, "selecting IBM as the hardware vendor not just for the desktop but also for the servers [meant] we would get great pric-

ing and special help [from the vendor] in putting it all together."

Managing Change

Though The Feld Group and Westinghouse imagined and agreed upon a plan, translating it to reality wasn't without its managerial challenges.

While SITI called for supporting a single set of standardized desktop applications, workers were allowed to keep certain legacy applications under limited conditions. "People first had to provide proof that they needed a legacy application; plus management had to assure us that was a valid software need," explains Benkovich. Once those criteria were met, employees presented the application to the so-called Legacy Lab, which had been created specifically to measure existing applications against the new SITI configuration.

Acker, for example, needed to maintain a copy of WordPerfect on his system simply because so many of his old files were in that format. "I checked with the Legacy Lab, and they were very flexible," says Acker. "They weren't being the IT police; they just wanted to make sure it worked OK." Like the vast majority of Westinghouse workers, Acker is happy with the new software and uses his legacy word processor only to retrieve archived files. "They did a good job of communicating [the goals

"They weren't being the IT police; they just wanted to make sure it worked OK."

—Conrad Acker

of SITI], says Acker. The promotional information alleviated some of the workers' fears and helped them understand how they could benefit from using standardized desktop software, he says.

Reorganizing the IS staff was more painful. Westinghouse established a Customer Support Operation Center (CSOC) at company headquarters. "We [built] a truly centralized help desk for the whole company," says Graham, "where before we had had multiple systems engineers, PC and desktop support people reporting locally." With CSOC, all calls are directed to the help desk, and



Columbus used the information he knew to be accurate, combined it with the expertise he possessed and drew a conclusion that changed the way we look at the world.

As a young man, Columbus spent hours looking westward across the Atlantic at ships coming into port. First, he would spot the top of a ship's mast. Then, slowly, more of it. Finally, the entire ship would become visible. At first



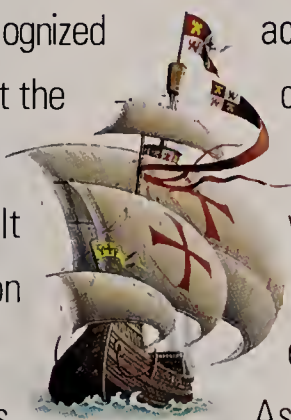
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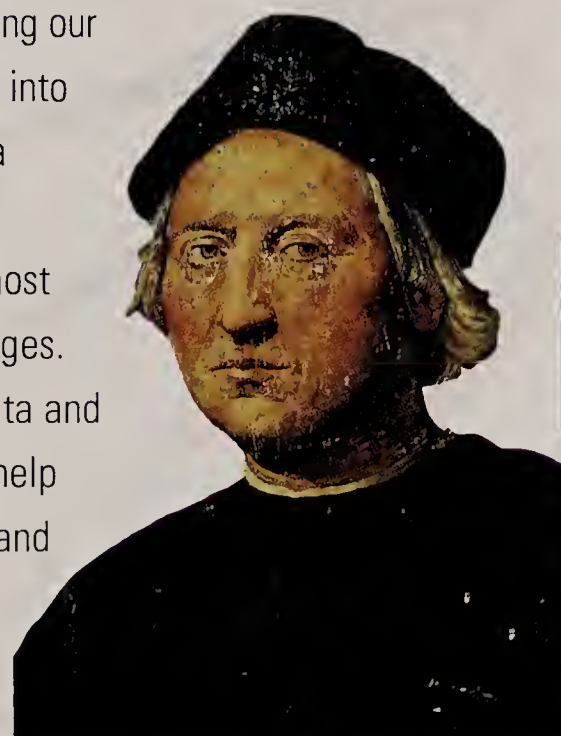
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then bounced to a level-two team if they can't be resolved. If the problem still needs attention, an on-site support worker can be dispatched to a worker's desk.

The plans called for some 80 people to work at the data center in Pittsburgh. At the central help desk, Westinghouse wanted a ratio of 300 desktops per support worker; on-site, the goal was 200 to 1. Previously, the ratios varied from department to department, says Dittrich, but averaged between 50 and 75 workers per support staffer in the field. With the new ratios in hand, managers simply determined how many people worked at a given site, assigned the correct number of support staff, then reduced the number of employees accordingly. So far, Westinghouse has reduced its IS workforce by 250 people.

Westinghouse managers struggled to find the best way to determine who would stay and who would go. "We tried to let people know they wouldn't have a long-term job, in some cases a year or more in advance," says Graham. "It was the most humane way we could think of."

Once new IS positions were established, employees could apply for those jobs. Again, the company tried to let people know quickly if they would be on the team at the new Westinghouse. "People who had a job often [obtained] a better job," says Graham.

Feld consultants, including Monte Jones, who was acting CIO at Westinghouse until Dittrich's arrival, and the

Westinghouse at a Glance

Westinghouse Electric Corp. is a 110-year-old industrial conglomerate that until recently encompassed power, media and defense businesses. Defense electronics was sold in 1996. Westinghouse's Industries & Technology Group and Westinghouse/CBS Media Group, which comprise the present-day corporation, are scheduled to separate sometime in 1997.

Home Office: Pittsburgh

Revenues: \$8.5 billion in 1996; \$4.2 billion from the Industries & Technology Group

Employees: Approximately 50,000, with about 40,000 working in the Industries & Technology Group, which will become Westinghouse Electric Co. after the split

Employees in IS: 500 to 600

Products: Power-generation plants, equipment and services; nuclear power plant services and fuel; management of government facilities that handle and store nuclear materials; management of government chemical weapons destruction facilities; process-control equipment for power, water/wastewater and industrial plants; transportation of temperature-control equipment

consultancy's founder, Charlie Feld, recruited candidates to fill the revitalized CIO position that would take direct responsibility for all information systems activities, both at headquarters and in the field. The Feld team "ran the technical filter" to make sure applicants were capable, says Dittrich. Then Westinghouse management vetted the list of candidates, seeking someone compatible with the company's new vision and management style. Frank Dittrich joined the company in June 1996 from Thomson Consumer Electronics of Indianapolis.

As the Dust Settles

Now, on the eve of a historic split that will separate the company's industrial and power businesses from its media holdings, the newly streamlined and energized Westinghouse Electric Co. is working on an end-to-end applications plan that exploits its new infrastructure.

Westinghouse, and Dittrich in particular, are pleased with the payback of the SITI project thus far (the rollout is expected to be completed in late 1997 or early 1998). The project is self-funding, as annual investment and return both add up to about \$25 million. And other benefits are readily apparent, Dittrich says: "There are 250 fewer people in support...[and] our acquisition price for assets is significantly lower than before.

We're able to acquire tier-one equipment at tier-two prices."

In addition, workers now have a "common language"—uniform messaging and shared applications—that allows them to communicate easily across departments and up and down the hierarchy. The central help desk, which fields some 10,000 queries a month, closes half of those calls on the first try, and Westinghouse's many networks are now managed centrally, saving IS workers time and effort. "From a delivery perspective, we're able to support and roll out things like client/server application changes with very low overhead," says Dittrich. "When we need a new virus scan sent out, it takes almost no effort at all."

Westinghouse may have undertaken SITI to clean up its bottom line, but the benefits clearly trickle down to the end users as well. "E-mail is working very well, and the network is better," summarizes Acker. As for the help desk, Acker is thrilled to say he hasn't needed it. "I haven't had to contact [the help desk] once since the migration," he says. "I had my half-day of training, and that's all I've needed." **CIO**

Freelance writer Tracy Mayor, who specializes in management and technology topics, can be reached at tmayor@shore.net.

The Setup

Operating system: Microsoft Corp.'s Windows NT Server

Desktop systems: Windows NT Workstation, 133MHz IBM Pentiums with 16MB RAM, a 256KB cache, CD-ROM, 1.6GB hard drive and 17-inch monitor

Desktop applications: Microsoft Office, Lotus Notes

Messaging: Microsoft Exchange Server

Network management: Microsoft's Systems Management Server

Servers: 166MHz IBM Pentiums with a 36GB hard disk, 512Kbps cache, an Ethernet 10/100 connection and an FDDI network adapter

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PREPARING
OIL EXPLORATION
FOR CHANGE

Oil Under Pressure

Virtual reality and co-opetition are making oil exploration a less slippery business

BY GENE KOPROWSKI

On a sunny day in the year 2000, Rock Cliff, an oil geologist for Houston-based Texon Oil Corp., enters a virtual reality booth, dons a VR glove and sits in the kind of swiveling chair NASA astronauts once used in space flight simulators. The lights dim, and the geologist is surrounded by VR images beamed onto three of the room's walls. Another VR oil exploration session begins. Sifting through

the virtual sediment, Cliff has entered a tunnel several miles below the floor of the Gulf of Mexico.

Cliff motions with his gloved hand toward a crevice he sees in the Earth's crust. The glove sends commands over the radio spectrum to an array of computers hidden from view on the other side of the wall; via the World Wide Web, Cliff instantly is linked to oil exploration databases in the United Kingdom, Norway and Latin America. In addition, he has access to Texon's proprietary findings located in a relational database on-site here, at

THUMB NAIL

Industry: U.S. oil exploration

Primary Products: Petroleum for transportation and manufacturing

Production: U.S. crude oil production was roughly 6.5 million barrels per day as of December 1996

Revenues: At \$23.74 per barrel of oil, annual revenues topped \$153 billion

Resources: Approximately 151 refineries, 815 active drilling rigs, 1.5 million workers

SOURCE: BAKER HUGHES INC. (HOUSTON)





FORCES OF CHANGE

Environmental Concerns: The Exxon Valdez and countless minor spills have caused the oil industry to be more cautious.

Impact: Companies are forced to re-explore dry wells or find black gold in locales written off as unprofitable.

Price Competition: Cheaply produced foreign oil continues to erode the profitability of U.S. oil companies. Recovery from an oil patch crash in the mid-1990s is only now starting to happen.

Impact: Companies are focusing exclusively on core competencies and outsourcing the rest of their work to consultancies.

Fuel Efficiency: Today's cars drive farther on cheaper gas. The better fuel economy is another factor that erodes oil company profitability. Moreover, many consumers are casting aside oil as a source of home heating, switching to natural gas.

Impact: Industry increases reliance on additives to make fuel burn more cleanly, burnishing its attempt to project a pro-environment image.

ILLUSTRATIONS BY JAMES YANG

the IT Operations Command. Cliff's chair rotates 75 degrees to the left as PCs and workstations process the data. Simulated sedimentary images are beamed onto the walls. Cliff points his gloved hand, the operational equivalent of a double click. There it is! He has just discovered a previously unknown pool of oil, 500 kilometers due south of New Orleans. This one is going to be a major gusher. Not bad for an afternoon of work. Cliff swaggers out of the exploration room, struts down the hall and positions himself near the water cooler to relay casually his exploits to his pals.

That is how oil companies will search for black gold in the not-so-distant future; it sure beats wildcatting. Oil exploration is undergoing a massive transformation because of an array of economic and political pressures, a changing business environment that makes new relationships among enterprises and technological changes.

In the Oil Patch

The price of oil has decreased by as much as 50 percent since it topped out in 1986. According to the American Petroleum Institute in Washington, the industry also has consolidated dramatically. Close to 430,000 U.S. oil industry jobs have been eliminated since the early 1980s. Today, oil provides about 40 percent of the nation's energy, down from a peak of nearly 50 percent in the late 1970s. But the United States produces only two-thirds as much domestic crude oil now as it did a quarter-century ago.

In other words, usage has dropped less than 10 percent, but production has dropped 33 percent. According to the American Petroleum Institute, domestic production of crude oil fell from 9.6 million barrels a day in 1970 to 6.5 million barrels a day in 1996. What's more, while domestic crude oil production has declined, government restrictions limit access to the most promising untapped domestic areas for exploration and production, writes Daniel Yergin in his Pulitzer Prize-winning book, *The Prize: The Epic Quest for Oil, Money and Power* (Simon & Schuster, 1992). Those untapped areas include potentially huge reservoirs of oil in Alaska and off the coast of California.

With such promising regions now forbidden, oil companies have been forced to search for oil in locales they may have written off as too expensive. The introduction of IT, however, is alleviating the once-prohibitive cost. Exploration data—gathered via remote-sensing satellites—robotic exploration, old-fashioned physical drilling and 3-D seismic imaging are being linked to the desktop via client/server and Web technologies. From the desktop, petroleum geologists can evaluate subsurface conditions in the desert or under the sea.

"Oil companies are desperately looking to IT to keep costs down and squeeze a profit out of their production," says Roger Goodan, vice president of business development at GeoQuest, a Houston-based software developer and oil industry systems integrator that is a division of Schlumberger Ltd.

The virtual reality scenario Rock Cliff enjoys is not merely a figment of some geologists' imagination. It is the evolution of the 3-D experiments with exploration that major oil companies are conducting. Though most swaggering, tough oil explorers, who may have gone into

that field to avoid the day-to-day routine of an office job, may not want to be desk-bound, virtual reality exploration will provide them with a better-than-being-there experience that is safer than clambering over rocks or deep-sea diving.

A few years ago, the \$153 billion U.S. oil industry shrugged off suggestions that it could rely heavily on information technology in the exploration process. The industry believed software applications, parallel processors and robotic vision technologies were not robust enough to be relied upon. But because the technology has evolved, executives can't ignore IT anymore.

The adoption of new technologies is one reason the industry finally is starting to think about growth after years of a declinist mentality. The oil exploration business began to realize the power of IT when two technologies matured in the early 1990s: 3-D seismic imaging, directed to the location of new reserves; and bit-steering and measuring while drilling (MWD), which increases the efficiency of wells. Industry CIOs say 3-D imaging has produced results by weeding out poor drilling prospects and by assisting in the discovery of additional reserves in existing fields. Bit-steering, best described as videoconferencing inside an oil well, has increased the industry's oil recovery rates from wells and lowered the decline rates of existing wells, according to Cambridge Energy Research Associates, an industry research organization in Cambridge, Mass. Data gathered by those tools is linked to PCs for viewing by petroleum engineers and geologists. By the year 2000, 3 percent of oil consumed globally will have been recovered through all those methods.

Sliding Into High-Tech

The oil business has never been too keen on information technology, industry insiders indicate. In the past, exploration was always an intuitive, gut-instinct kind of business. But in a world where the parameters of exploration are curtailed by the government and consumers hope for less expensive fuels every year, the industry had to start relying on real information rather than just wild guesses and wildcatting. During the mid-1980s, companies in the oil industry started to purchase PCs and automate some information maintenance and

I.S. ACTIONS

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Eliminate barriers to sharing of nonproprietary data.

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Photo Credit: Scala/Art Resource, NY. Michelangelo Buonarroti. The Creation of Adam: detail of the hands of God and Adam. Sistine Chapel, Vatican Palace, Vatican State.

retrieval functions. But a wave of mergers in recent years caused plenty of difficulties, as companies were compelled to combine aged legacy computer systems that often were incompatible. "Everybody in the oil industry was convinced that their method of doing business was completely different from their competitors' ways of doing business," says Robert Legge, U.K. general manager of Artemis Management Systems, a software developer and consultancy based in Fairfax, Va. "Consequently, they all built proprietary systems and applications or had them built," he says. "There was no concept of standards or interoperability. It was very costly to manage data."

BJ Services Co. of Houston, an oil-field services company that in early 1995 merged with Houston-based Western Co. of North America, illustrates the typical woes faced by oil industry CIOs. "The companies had two totally different technical directions, and our task in MIS was to realize the consolidation benefits from that merger," says Steve Crawford, director of MIS services at BJ Services. BJ implemented a WAN to cover the United States with frame-relay and IP protocols that used data link switching to connect to a mainframe.

Prior to the merger, it hadn't so much as linked its LANs in individual offices. But the merger created an opportunity for the company to adopt a single stan-

Nanotechnologies, or miniaturized robotics, may become reality. If so, micro robots can pursue geologists' dreams in untapped wells inexpensively and quickly.

dard for desktop and notebook hardware and software. When LANs were installed at the company's offices, the company standardized on Microsoft Office. In 1996, BJ Services began to communicate via the Internet and installed e-mail on the desktops of 1,300 employees. Only now, two years after

the merger, is the company starting to realize productivity gains—like having real-time access to financial and operations data and the capability to transmit PC-based data across the network. Also, the capability is now in place for the deployment of proprietary client/server applications across the network.

Vastar Resources Inc., a Houston-based oil and gas exploration production and marketing company, also had to tackle the standards problem. Two years ago, the company began installing a client/server network for 150 users in the United States, linked to a Finder data management system from Oracle Corp. of Redwood City, Calif., and servers running Microsoft Corp.'s Windows NT. "We just came off the mainframe in 1995, which was in Dallas, while we were in Houston," says Stephen Balough, manager of exploration computing systems at Vastar. "We have 3-D seismic data from onshore and offshore sources," he adds. "But nothing was interactive. All of the data was stored somewhere out there, and only certain technical people could access it." Data on old, legacy IBM mainframes was stored on metal tapes in a library, and

those people seeking information often had to wait days for answers to specific queries. That lack of interactivity dramatically slowed the industry's ability to access information essential to exploration projects in the United States.

The Oracle relational database—integrated by GeoQuest—brings massive amounts of cultural, seismic, geologic and engineering data on more than 1 million oil wells to the desktops of geologists and petroleum engineers, reducing Vastar's exploration costs by 50 percent. For example, maps for exploration are produced interactively using a database. A geologist enters a query into the database, based on coordinates of an area he would like to explore. The database then searches for answers to his queries, sifting through information about the subsurface structure, environmental impact of drilling and depth of the possible oil reservoir. "Getting that data faster makes a huge difference when you're competing with other companies," says Balough.

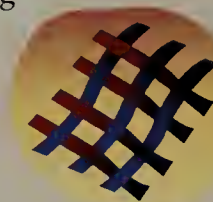
Companies in the oil industry are not just buying technology for technology's sake or because they simply must have the latest Netscape Communications

COMMON THREADS

IS executives can expect change to come from these drivers

Competitive Pressures: As in other industries, IS can create value for shareholders by reducing costs. After years of consolidation, the industry also is going to have to find a way to grow. IS is essential to that strategy as well.

Generational Change: A new cadre of personnel are moving into the industry, and these people have grown up using PCs and the Internet. They bring a more intuitive grasp of what technology can do for the organization and are more open to change. The end of resistance to IT solutions will have a big impact on the oil industry.

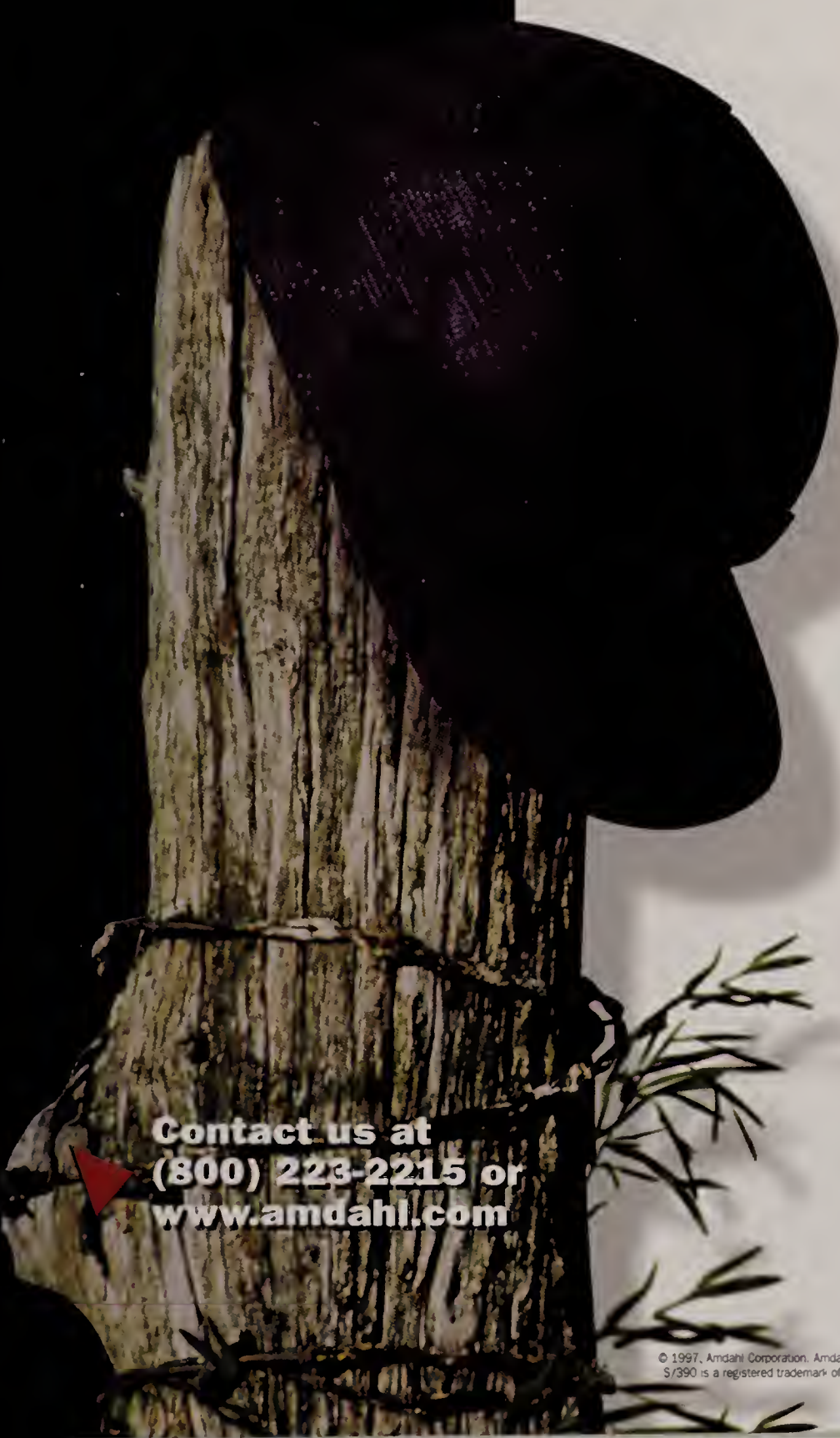


Acceleration of Innovation:

Moore's law applies to the oil industry as well as other industries. As hardware continues geometrically increasing in potency and decreasing in price, previously unthinkable new software applications can be developed.

Attention turns to solving the new set of problems, and older issues lose relevance.

Technology Transfer: It took 15 years for 3-D seismic data analysis to make it from the lab to the desktop and mainstream use. But the arrival of newer technologies, like virtual reality, will happen much more quickly.



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Corp. browser they've seen in the trades. They're setting IS strategies and sticking with them. London-based British Petroleum Exploration Co. spent \$130 million on IT in 1996 and expects to spend a similar sum this year. In addition, it has outsourced most of its back-office financial and administrative functions, such as billing and payroll, to Andersen Consulting's Energy Industry Practice in Dallas to focus on its core business—energy exploration.

The Shape of Things to Come

Continuing to bring oil search and exploration data to the desktop—or to the virtual reality room—depends upon many enabling technologies. There are four technological developments that CIOs in the oil business should watch for and help bring to fruition, according to a Cambridge Energy report, "Quiet Revolution: Information Technology and the Reshaping of the Oil and Gas Business." Those developments include object-oriented programming (OOP), technical computing, easier communications and Internet standards.

"Software packages become available for business applications using object-oriented databases. They need to be run on powerful, new client/server networks,

but the improved hardware must be compatible with a wide range of OOP software," the report indicates. "Suppliers will need to support the migration from relational to OOP databases." Because of that coming transition, high-performance computers made for the geosciences must also change. Software will have to present models beyond subsurface spaces, field engineering and well design. Simultaneously, faster modems and communications will make it easier to collect information over the Internet. Eventually, the Internet will operate as a standard interface for different applications, reducing complexity for users.

Other technologies may have unforeseen impacts on the oil industry, according to Cambridge Energy. Combined with fiber optics, photonics—using light to store, process and transmit information—will allow even more data to be transferred over the Web at literally light speed. Nanotechnologies, or miniaturized robotics, may become reality. If so, micro robots can pursue geologists' dreams in untapped wells inexpensively and quickly.

Many companies' databases are filled with information known and held by other companies. In the future, rather than companies storing nonproprietary data on their own databases, they will

store information in a shared data bank. Since 1995, IBM Corp. has worked with many major oil companies on the PetroBank Master Data Store (MDS) Solution. The MDS will create a multi-client, modular system for storing seismic, well and other data to provide a secure online exploration and production data archive management system that comprises databases and geographic information systems. The databases will contain technical information on such matters as seismic traces and well logs. Companies like Houston-based PGS Data Management are starting to tap into those databases; by using machines from Silicon Graphics Inc. and standard Web browsers, 3-D oil exploration will be made possible from the desktop workstation. Rows and columns of exploration data—longitude and latitude of specific geologic sites—will be transformed into 3-D visual images that graphically represent the site. Oil explorers will be able to tap a database, perhaps IBM's PetroBank, via the Internet and combine common data with their own, in-house data. "That will open up some more doors. You will be able to save even more money because you won't have to store the data or have as many IT personnel to manage it," says Balough.

But even bigger technical adventures lie ahead for oil industry CIOs at the turn of the century. Geologists are currently experimenting with the Data CAVE (Cave Automatic Virtual Environment), a 3-D virtual reality exploration device at the University of Houston (see "Virtual Reality," Page 128). Working with NASA and the university, some oil companies are running virtual reality simulations of oil exploration using public knowledge and seismic and satellite data. A Silicon Graphics Reality Engine and four video projectors are used to cast images upon the walls and floor of the Data CAVE, creating a virtual reality experience for an oil geologist, a guy like Rock Cliff. "It's pretty amazing," concludes Balough. "You literally will be able to look at the reservoir of oil and feel the heat. It's going to completely change oil exploration." **CIO**

Gene Koprowski is a freelance writer based in Chicago. He can be reached at genecasap@ix.netcom.com.

OIL INDUSTRY AT A GLANCE

Past

- Preliminary basemaps of likely oil fields, as recently as the 1980s, were typically made on a mainframe with hand-designed contours, since early computer applications left analysts with doubts.
- Horizontal drilling was in its early stages. Sensing tools were not always reliable.
- Televiewing of bore holes was limited.
- Cray supercomputers were used for what is considered today relatively unsophisticated analysis.



Future

- Better software reduces the margin of error, enhances imaging and increases time spent drilling.
- Sensing systems take measurements every few feet when a drill is underground. Seven horizontal wells can be drilled from one vertical hole and can have an extended reach of 7,000 meters.
- Reservoir simulations on supercomputers will use 10 times the number of grid cells, giving more precise locations of likely oil finds.





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IN FALL 1996, SENIOR EDITOR Christopher Koch had occasion to bring together a group of distinguished IT executives for dinner and some thought-provoking conversation. One of the subjects that cropped up revolved around how they were thinking about and implementing knowledge management practices at their companies. The participants included John Cross, head of IT in the BP Group at The British Petroleum Co. PLC; Patricia M. Wallington, vice president and CIO of Xerox Corp.; and Albert Aiello, former CIO and now a managing director at Fidelity Investments.





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KNOWLEDGE MANAGEMENT

What do you see happening in terms of knowledge management's role in providing value to the organization?

Cross: [At British Petroleum], we think there is another level of performance that can be extracted by a more powerful utilization of the knowledge inside an organization. I think the challenge is, well, what does that mean? And how does it translate into practice?

Rather than talking about it, we're simply running a lot of pilots in and around it. We have been looking at the key processes of the business, testing them for their "knowledge intensity" to see if we would create some significant new change in the performance of that particular process if we managed knowledge in a more profound way. The concept has not been difficult to sell to the top executive team.

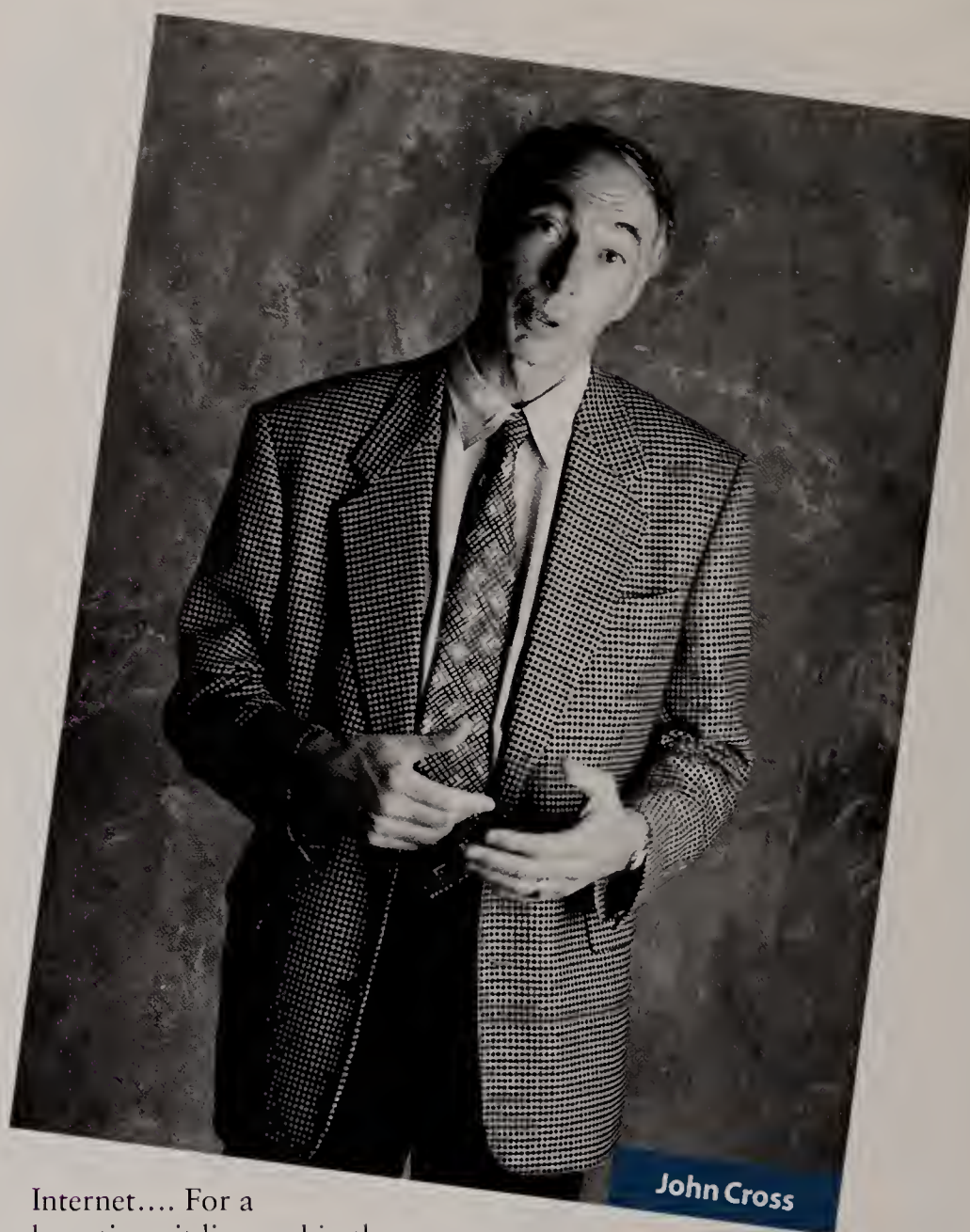
Wallington: I like to look at the historical perspective because it gives you a framework within which to understand what's happening. Think about how the industry has evolved: First it was computer management, then data management, then information management and now knowledge management. I think IS is beginning to come up the value chain of the organization; with knowledge management, we're coming up into the sphere that the senior executives understand: information. It's not mature in terms of our understanding and its content, but I think that this is clearly the next step in where this is going.

Cross: The chief executive of our aviation business said, "I know that getting the next 10 percent of performance out of this business is going to be entirely dependent on my ability to manage knowledge."

That was quite an interesting observation because knowledge is what executives really work with when you think about it. It's not a techie thing.

There is a need to understand how to find knowledge as much as how to leverage it. You have to figure out how to get at the knowledge of the organization before you can really create value from it, don't you?

Wallington: We need a way of giving people easy access to the knowledge of the organization. Think about the



Internet.... For a long time, it lingered in the background, used by academic and research-oriented people, and then along came the Web and browsers and easy access. Any time there's a vehicle for easy access, it creates an opportunity for explosion. I think knowledge management will follow that same kind of cycle.

Can you provide some examples of ways you're pursuing knowledge value in your processes?

Cross: In the oil business, we spend a lot of money trying to punch holes in the ground in drilling. We reckon that, broadly, we should be able to halve those sorts of costs. And we know that knowledge management is one of the key strategic levers to performance in drilling. Absolutely. We can track our performance and improve our drilling rates, and it is almost all due to incremental buildup of knowledge about the management of the drilling process. So we're concluding that this would be one of those knowledge hot spots with high financial leverage.

We can track our performance and improve our oil drilling rates, and it is almost all due to incremental buildup of knowledge about the management of the drilling process.

-JOHN CROSS



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You have to get management and the organizational structure out of knowledge management.

—ALBERT AIELLO

What are the cultural inhibitors to sharing knowledge?

Aiello: That's one of the major issues here. We've talked about simple code sharing for 20 years, and it's never really come to pass. The real issue in my mind is getting people to do this. On a simplistic level, the technology to do this has been available for 20 years.

I suspect we will discover more breakthroughs. If you look back, we went from the functional organization to teams, virtual teams and everything else. And that was an organizational breakthrough in terms of forgetting boundaries and instead solving problems. I don't think we've made that kind of progress regarding motivating and incenting people to participate in sharing knowledge across organizations.

What are some specific incentives you use to encourage people to share knowledge?

Aiello: We do something that helps foster that approach [at Fidelity]. We have what we call Quality Councils and Quality Improvement Teams, or QITs. They form themselves. They look for best practices. They fix issues. They disband. They are cross-boundary groups trying to get people to work on problems that they see without having management approve or authorize it.

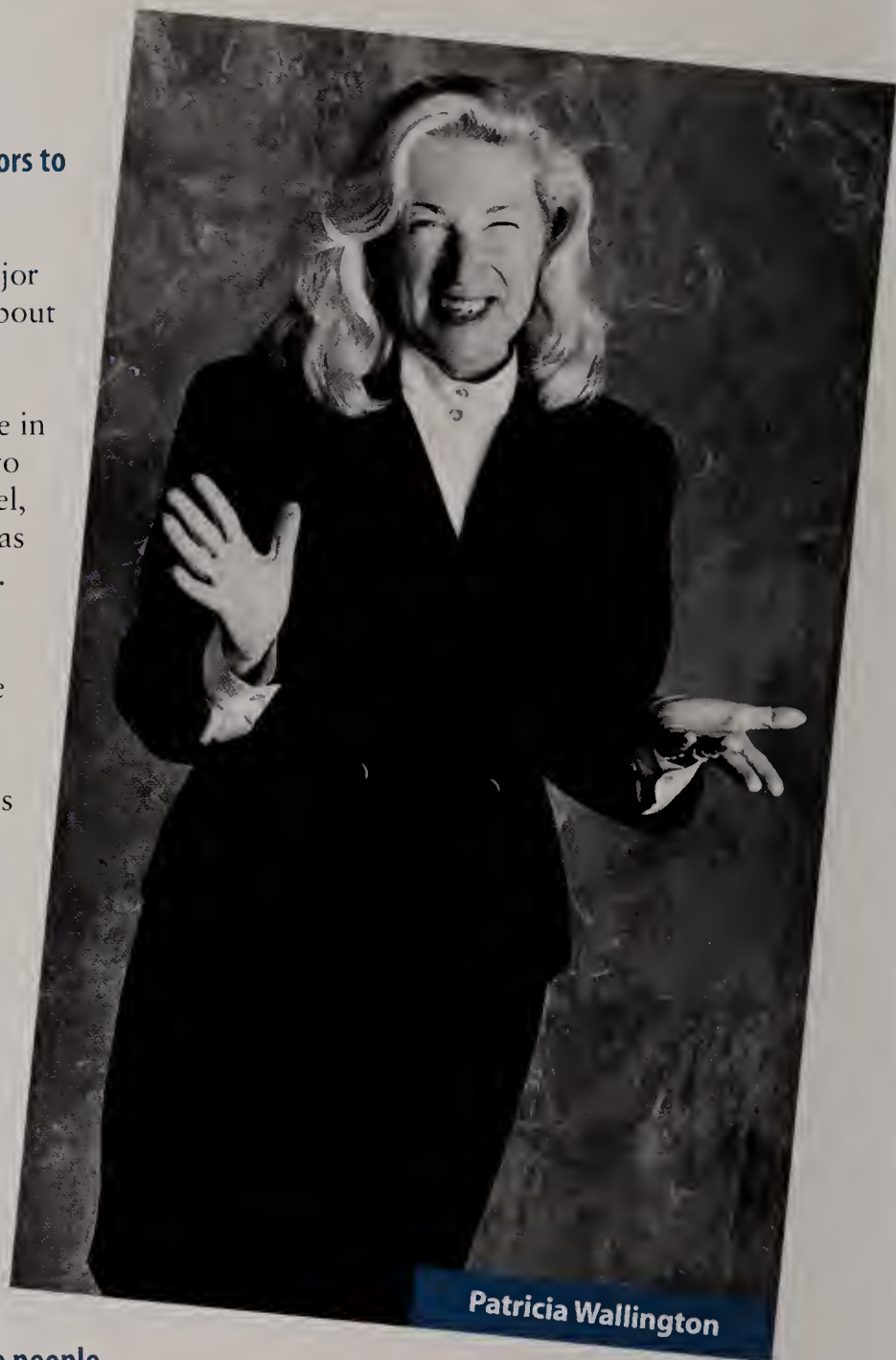
We also recognize their achievements—and not necessarily with money. Well, ultimately we do select the best [team] of the

year and give them money, so we do get to that level. But prior to that, we have a lot of drama in terms of recognizing QITs of the quarter and so on and so forth.

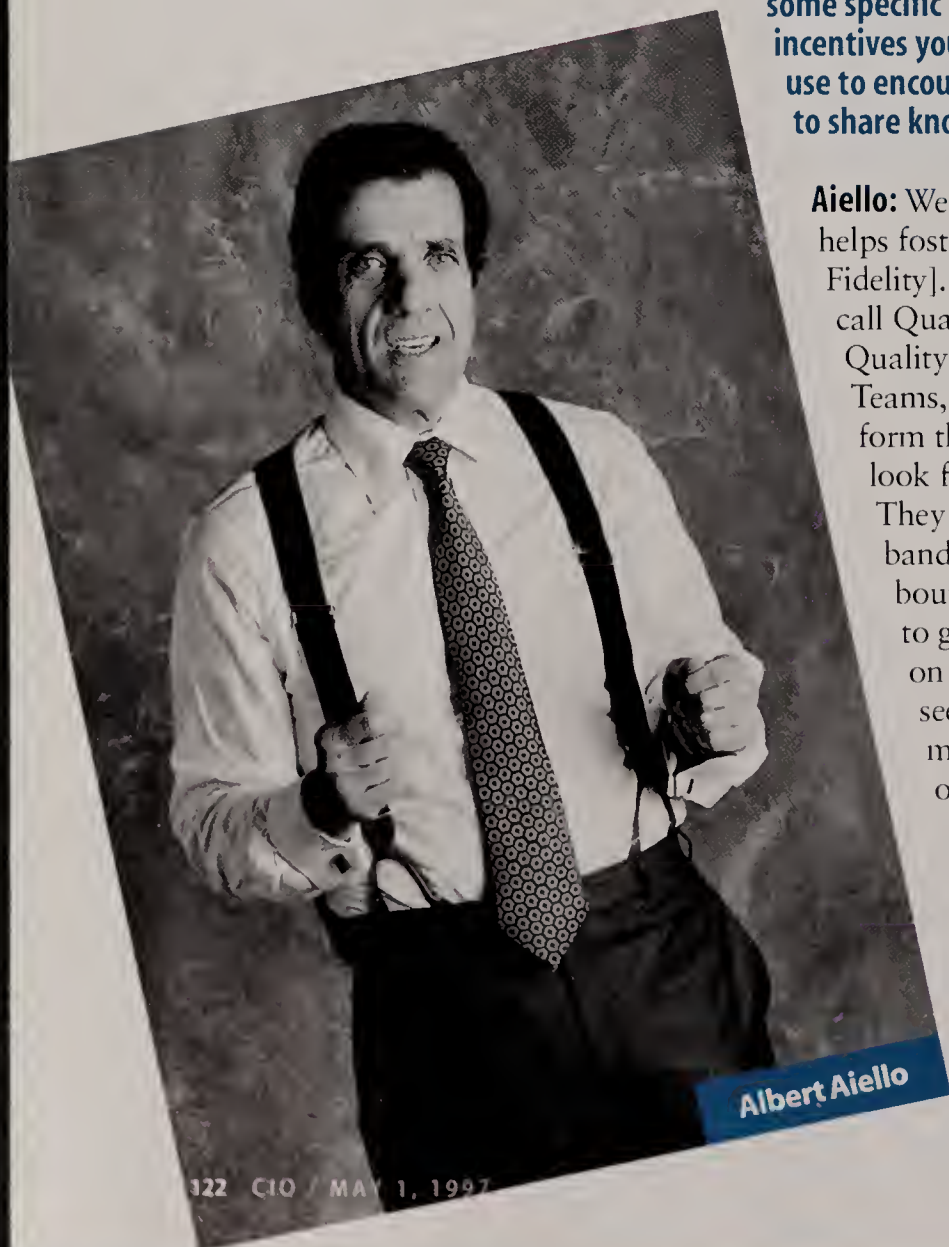
We now have almost 50 percent of our systems company organization involved in those QITs at any point in time. I haven't the foggiest notion which ones are going. I get a list, but I don't approve it, and I don't get involved in it. There are regional quality councils comprising employees—project management, technical, those kinds of people—who make sure the QITs don't come up with ideas like painting the walls of the cafeteria.

You have to get management and the organizational structure out of knowledge management. You have to use technologies that enable it to be collaborative, but it's more than just technology. Those are multi-dimensional problems, and technology is a piece of it. But the QITs at Fidelity use no technology whatsoever. **CIO**

Senior Editor Christopher Koch can be reached at ckoch@cio.com.



Patricia Wallington



Albert Aiello

APPLICATION FORM



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CRITERIA

A panel of independent judges will choose winners from among entrants who have submitted completed application forms to *CIO* by July 1, 1997.

Entries will be judged on the following criteria:

- The extent to which the system adds business value in furthering the organization's strategic or operational objectives
- The measurable financial return the system provides to the organization
- The extent to which IT was key in achieving the overall business solution—the "couldn't have done it without technology" factor
- The quality of collaboration between the business unit and IS organization that is achieved throughout the course of the project

Each finalist will be subject to an in-depth analysis of the nominated system (to be performed by *CIO* or its agents). That analysis, which may require a site visit, will be based on interviews with sponsoring executives and system users and will be designed to substantiate all claimed benefits. Notification of winners will occur in October 1997. *CIO* reserves the right to publish relevant cost and savings figures that establish the claimed ROI of the system; the willingness to divulge that information for publication is a condition of entry.

DEFINING VALUE

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is intended to help guide applicants' thinking:

- new, innovative and more productive ways of doing business
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- the ability of the enterprise to enter a new market
- successful global operation or expansion
- transformation of the way the enterprise competes within its customary market or of the terms of competition within the market

- improvement of the enterprise's relationships with its external customers
- improvement of the enterprise's relationships with its own employees or among its functions (such as marketing, finance or human resources)
- the ability of the enterprise to compete more effectively by adding to the sum of its available knowledge assets
- leaner and more economical operations

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1995.
- Entrants must agree to be featured, along with their systems and organizations, in a *CIO* article.
- Entries must be complete.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Entries must be made jointly by the IS executive *and* the business sponsor for whom the system delivers value.
- IT vendors, public relations and advertising companies, consultants and other third parties may *not* apply on behalf of another company. They are encouraged to forward this form to the "owner" of the system or to contact *CIO* Communications to recommend that an application form be sent to the client.
- All entries must be computer-generated or typed; no handwritten entries will be accepted.
- Entries must be on 8.5-by-11-inch paper, one side per sheet.
- When feasible, an additional copy of the entry should be sent on a 3.5-inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel on a Windows or Macintosh platform.
- To view a complete sample application, or for more information on the Enterprise Value Awards, please visit our Web site at <http://www.cio.com/forums/EVA.html>.

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4. A collaboration between an IT and business executive

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JUDGES SELECT WINNERS: October 1997

WINNERS ANNOUNCED: October 1997

AWARDS CEREMONY: February 1998
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IF YOUR INNOVATIVE SOLUTION meets the criteria, please complete this Enterprise Value Awards application form. The Feb. 1, 1998, issue of *CIO* will feature profiles of the winning organizations and the executives who have proved that their technology investments have had a positive and sustained impact on enterprise value.

IN FEBRUARY 1998, *CIO* will host a special awards ceremony honoring the Enterprise Value Award winners at the annual *CIO* Enterprise Value Retreat. For more information, please contact Lisa Kerber at (508) 935-4449.



1. COMPANY/BUSINESS UNIT

name of parent company

city, state where headquarters are located

publicly or privately held?

annual revenues

industry

name of business unit or organization

city, state where located

number of employees at business unit

URL

2. ENTRANTS

A.

name of entering IS executive / system sponsor

title

name of division, department or unit

address

city

state

zip

telephone

fax

e-mail

B.

name of entering business-unit executive / sponsor

title

name of division, department or unit

address

city

state

zip

telephone

fax

e-mail

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A.

name

title

telephone

fax

e-mail

reason for inclusion

B.

name

title

telephone

fax

e-mail

reason for inclusion

C.

name

title

telephone

fax

e-mail

reason for inclusion

D.

name

title

telephone

fax

e-mail

reason for inclusion

DEADLINE: JULY 1, 1997

Mail to: Enterprise Value Awards • CIO Communications, Inc.
492 Old Connecticut Path • P.O. Box 9208 • Framingham, MA 01701-9208

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (*company, business unit, agency*) in 500 words or less. Include information on:

- when the organization was founded
- mission statement
- major products and services
- markets served
- your organization's standing within its industry
- any other data you believe to be relevant in terms of general background

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to your organization by completing the following sections. Please limit your material to one page.

System Description: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or document-management system; switch to a client/server architecture; global network implementation).

Technical Profile: Briefly describe the technology of the nominated system. Please include the names of major vendors and products. (NOTE: The examples provided here are meant to be illustrative, not all-inclusive.)

- Architecture (e.g., client/server, mainframe)
- Hardware (e.g., mainframe/parallel processor, mini-computer/server, PCs, handheld devices)
- Software (e.g., operating systems, database system, application software)
- Software development tools (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- Network/communications hardware, software and services (e.g., modems, routers, e-mail packages, carriers and public networks)

6. BUSINESS IMPACT

Describe the primary business objectives of and value delivered by the IT investment. Please limit this section to three pages.

Statement of Value: List the three most important contributions the system has made to the business (please refer to "Defining Value" section on the first page of the application form).

Business Value Description: In detail, describe how the system delivers the value identified above (please include supporting data). Also describe any added value delivered, whether intentionally sought or serendipitously encountered.

Scope and Impact: Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business. Also indicate the system's uniqueness compared with solutions being deployed by other companies within your industry.

The Importance of IT: Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

Collaboration: Describe how the business unit and IS organization worked together throughout the project, from conceptualization to implementation. What were the specific tasks fulfilled by the business unit? The IS organization?

7. QUANTIFYING ROI

Provide a detailed, one-page summary of the nominated system's investment costs (including all upfront development expenses and annual maintenance charges). Also provide estimates of returns (including increased profits, reduced costs and indirect cost-avoidance). Estimates of costs and returns should be made per annum over a five-year period. This data is required to make it past the first round of judging. If your company is selected as a finalist, you will be required at that time to fill out a standardized table detailing specific costs and returns.

8. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the application is to be considered.

Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the Enterprise Value Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for CIO Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1. _____
signature of nominating IS executive date
2. _____
signature of nominating business executive date

9. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in CIO Magazine?

- ☐ Yes ☐ No

How did you learn about the Enterprise Value Awards program?

- ☐ CIO Magazine ☐ Academician ☐ cio.com Web site
☐ Consultant ☐ IS staff member ☐ PR Agency
☐ Systems Integrator ☐ Other publications ☐ Other
☐ Vendor ☐ Advertising Agency (please identify)

CHECKLIST

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

Have you included on separate pages...?

- ☐ Nominated Organization
☐ Nominated System
☐ Business Impact
☐ Quantifying ROI

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you checked off...?

- ☐ Other Editorial Opportunities
☐ How you learned about the Enterprise Value Awards program?

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*Vice President—Information Systems
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*Executive Vice President
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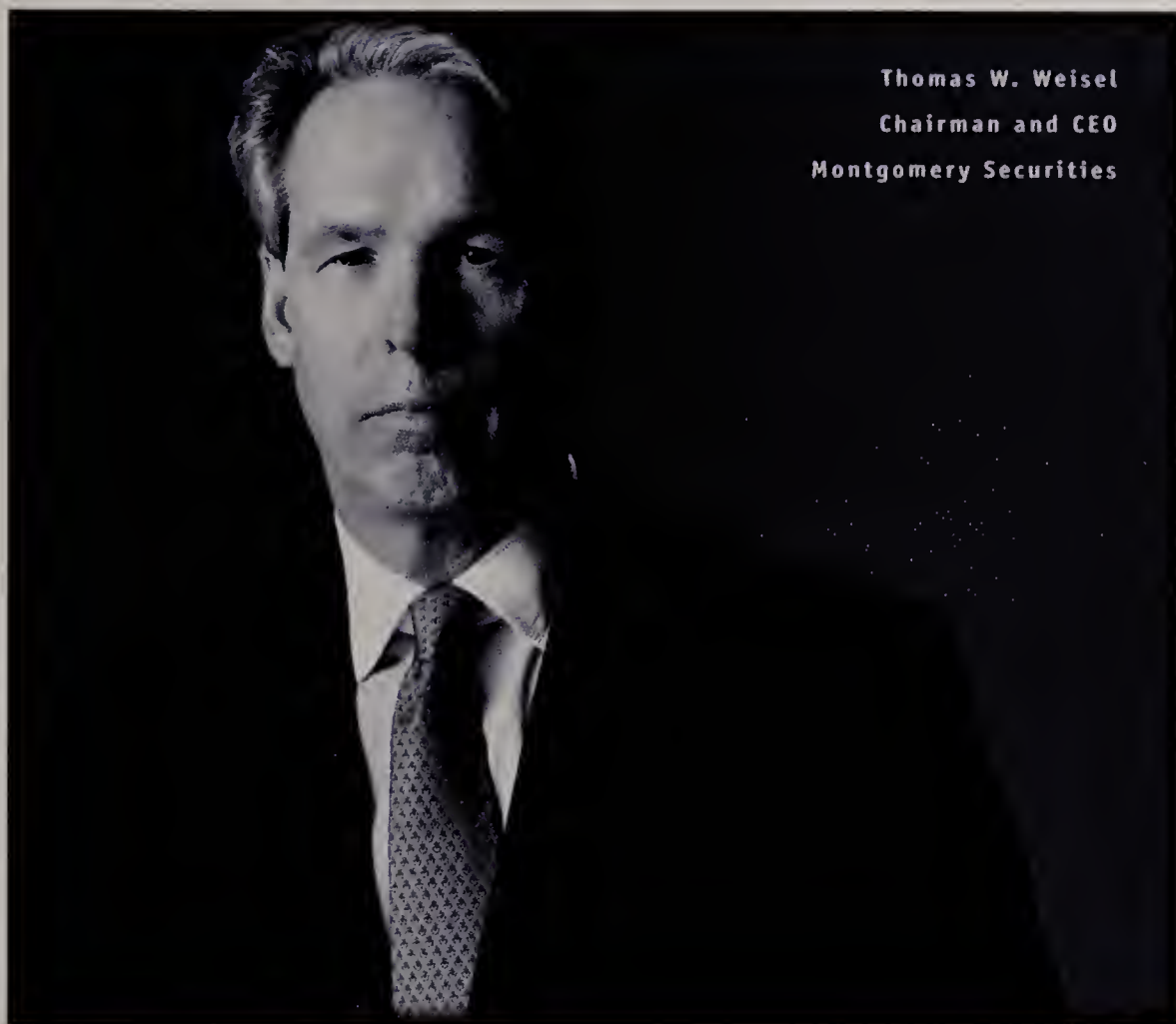


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Three Architectural Sins

All the hard work in the world can't compensate for built-in fatal flaws. The trick is to keep the basics always in view.

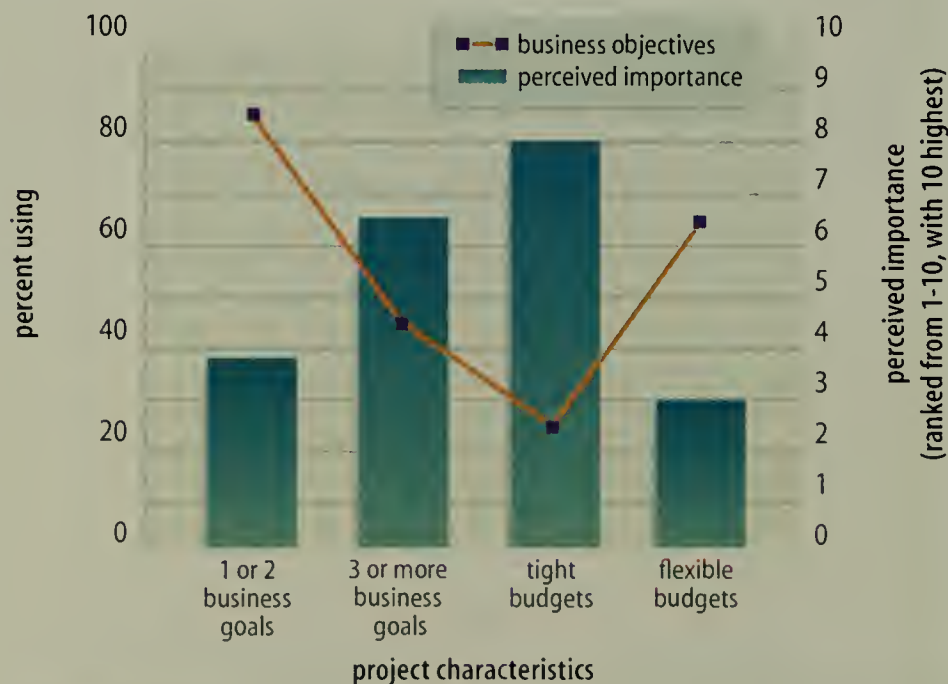
BY LARRY R. DEBOEVER and RICHARD D. BUCHANAN

COMPANIES AROUND THE WORLD have spent billions of dollars and expended centuries of effort on IS over the last 20 years. Despite armies of technically sophisticated managers, re-engineered core processes and the latest networking and computing products, 50 percent of all IT projects are deemed failures. As a result, many organizations are questioning IS's contribution to overall business success.

Meta Group Inc.'s work with large companies suggests that the source of doubt about the IS contribution lies in architectural design errors that sabotage subsequent operations efforts. We call these errors the three architectural sins: confusing an architecture with a "buy list" of approved products, failure to focus on adaptability as the key architectural design goal and treating architectural planning as a one-time event.

Project Characteristics

When 75 IT professionals identified and ranked the characteristics of a successful project, a startling gap appeared between perceived importance and a company's actual behavior.



SOURCE: THE BUCHANAN GROUP

Buy Lists and Architecture

Most large companies claim to have an architecture in place, but often what they have is no more than a simple buy list of approved products. An architecture provides a logically consistent set of principles that guide the engineering of an organization's information systems infrastructure. A list of approved products does not guarantee an effective architecture. Organizations must specify guidelines on how employees should use standardized products to achieve the goals of the enterprise.

For example, let's assume a company has 20 branch offices and its product standards designate HP-UX for production servers located in the data center, Compaq Computer Corp. servers running Microsoft Corp. Windows NT in branch offices and Oracle Corp.'s relational DBMS. Three separate development teams could use those product standards to implement three profoundly different architectures:

1. A system in which all applications and Oracle run on a single, very large Hewlett-Packard Co. processor, such as a T500 server, in the data center, and Compaq ProLiant 1500s are used in each of the 20 branch offices for e-mail, file and print services.

2. A system in which four midsize HP servers are located in the data center. One HP server is configured as a database server running Oracle. The other three HP systems are application servers, and Compaq ProLiant 1500s running NT provide work-group support in branch offices.

3. A system in which a single midsize HP server is located in the data center. That server is configured as a database server running Oracle, and Compaq ProLiant 2500s running NT are used in branch offices as application servers that also support work-group requirements.

Adaptability

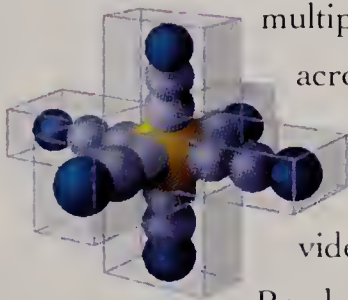
Ask the shell-shocked manager of any failed IS project to describe the effort's

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Meta View

primary design goal, and you'll get a variation of the same sad tale. "Well, it had to be client/server; fit on our newly purchased midrange servers; utilize TCP/IP; deliver data to anyone, anywhere, in any form; provide an intuitive graphical front end to a new class of users; improve response time; lower costs; etc."

Such laundry lists of multiple and conflicting "goals" are symptoms of the underlying business challenge faced by all modern organizations—*business-process cycle times are collapsing*. During the 1970s and 1980s, processes such as selling a product, shipping a good, registering a voter, issuing a traffic citation or hiring an employee remained relatively stable for five, six or even seven years. Today, businesses are reinventing processes as often as every six to 12 months.

As a consequence, adaptability must become the primary architectural design goal, and IS costs, raw performance, user friendliness and response time should remain secondary. Meta Group's Enterprise Architecture Strategies service has defined 18 architectural best practices that maximize adaptability. Some of the most important best practices include the following:

- IS must design loosely coupled applications that are highly independent of each other rather than monolithic applications running on big servers. In an environment of swift change, discrete applications can be quickly modified without bringing the entire enterprise to a halt.
- The logical design of applications and databases should be partitioned with clear boundaries so that change and adjustments in one application or database will not affect the operation of other applications and databases.
- The interfaces between applications and subsystems should be message-based because asynchronous systems free resources and create a more flexible architecture.
- Applications must be business-event-driven because resources activated only by real-time events are at other times left available to the enterprise-wide system.
- A single backbone network image

must be presented to all users so that they can instantly see and access all resources on the network.

Such best practices encourage IS to create adaptive systems, but each tactical decision presents a possible trade-off

ideas to software developers. As a result, the number of steps required to produce research reports has been reduced by half, consultant-authors have recovered an additional 10 hours of billable time per month and support staff costs have

Adaptability must become the primary architectural design goal, and IS costs, raw performance, user friendliness and response time should remain secondary.

against other potential goals. For example, highly independent applications and partitioned databases may not simplify development or lower hardware costs. But successful companies are learning to accept trade-offs to achieve a competitive advantage in an era when short cycle time is the driving force and constraining variable of success.

Ongoing Planning

The term "architecture" suggests static, granite-based structures engineered to endure unchanged over centuries. But an enterprise architecture's challenge is to facilitate change. Businesses are being forced to rewrite their business rules, and their information systems must change fluidly. Successful enterprise architects have abandoned the linear, sequential design methods used by traditional mainframe developers. Instead, they have embraced an ongoing, iterative approach that implicitly assumes that no system is ever finished but remains a work in progress, passing through successive stages of conceptual design, implementation, testing, operation and refinement. That makes system analysis more difficult but more useful because it supports the most important of operational activities—continual improvement of business processes.

For example, a \$20 million management consultancy uses an iterative approach to incorporate users into every stage of its online publishing business. Managers, customers, third-party service providers and IS consultants are participants in an ongoing advisory board that regularly feeds new requirements, new criticism and breakthrough

declined by 25 percent. In addition, the organization conceived of a new publishing channel, a Web site. The consultancy was happy to discover that its presence on the Web not only served to broadcast information but also alerted the sales force of international prospects "knocking on the door."

An iterative approach often places architectural planning at odds with annual budget cycles and makes risk assessment difficult. But successful companies realize that budgeting and risk assessment are tools that, despite their usefulness, should not have veto power over strategic IS investments.

Avoiding those three architectural stumbling blocks may seem like common sense, but few companies manage to do it. The dynamics of organizations conspire to force multiple objectives into even simple projects. Action-oriented managers want to believe in the existence of a simple, direct solution to a variety of problems, the so-called silver bullet of product standards. Architecture efforts are so agonizing that no one wants to undergo them twice. Nevertheless, companies that survive the turbulent '90s not only will manage to avoid the common pitfalls but will create breakthrough IS strategies as well. **CIO**

Larry R. DeBoever, senior vice president of Meta Group's Enterprise Architecture Strategies service, and Richard D. Buchanan, program director of the service, can be reached at larry.deboever@metagroup.com and richard.buchanan@metagroup.com, respectively, or at 203 973-6700.

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Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Elaine M. Cummings

Virtual Reality

*Practical uses give
a soft science a
good name*

BY JOHN EDWARDS

ASSORTED COMPUTER visionaries and starry-eyed analysts—along with several awful movies—have combined to give virtual reality a kind of flaky reputation. But despite some technology evangelists' best efforts to ruin VR, the technology actually is beginning to make serious inroads into business.

Many managers still equate virtual reality with helmeted, spandex-clad space cadets flailing about in a semi-darkened room. But practical VR applications tend to be far more practical and somewhat less frenzied, says Gordon Richardson, director of technology and product development at consultancy Arthur D. Little Inc. in Cambridge, Mass. He explains that managers should regard VR simply as an extension of existing computer technology, "not as a science-fiction effect."

Virtual reality has a "growing number of practical uses in such fields as manufacturing, marketing and training," he adds.

Virtual reality is an umbrella term for technologies that give users access to artificially created environments, Richardson says. "In a VR world, users can test procedures quickly, safely and inexpensively or visualize information in an entirely new way." He adds that there are almost as many VR technologies as

there are potential uses. "There's something to meet every need," he says. "Users can experience the technology with something as sophisticated as a full-immersion holodeck-like platform from *Star Trek* or with a desktop Pentium PC that lets them view and manipulate objects with an ordinary monitor and mouse."

Into the Cave

Full-immersion VR platforms, with their high-powered hardware and elaborate support needs, are considered by many experts pure VR because they are best equipped to create a convincing artificial environment. But the high cost of such systems can be a deterrent. Many organizations with pending VR projects abandon plans for an in-house system in favor of contracting time on a full-immersion system housed at either a regional research university or a facility sponsored by an industrial consortium. One such system is the Cave Automatic Virtual



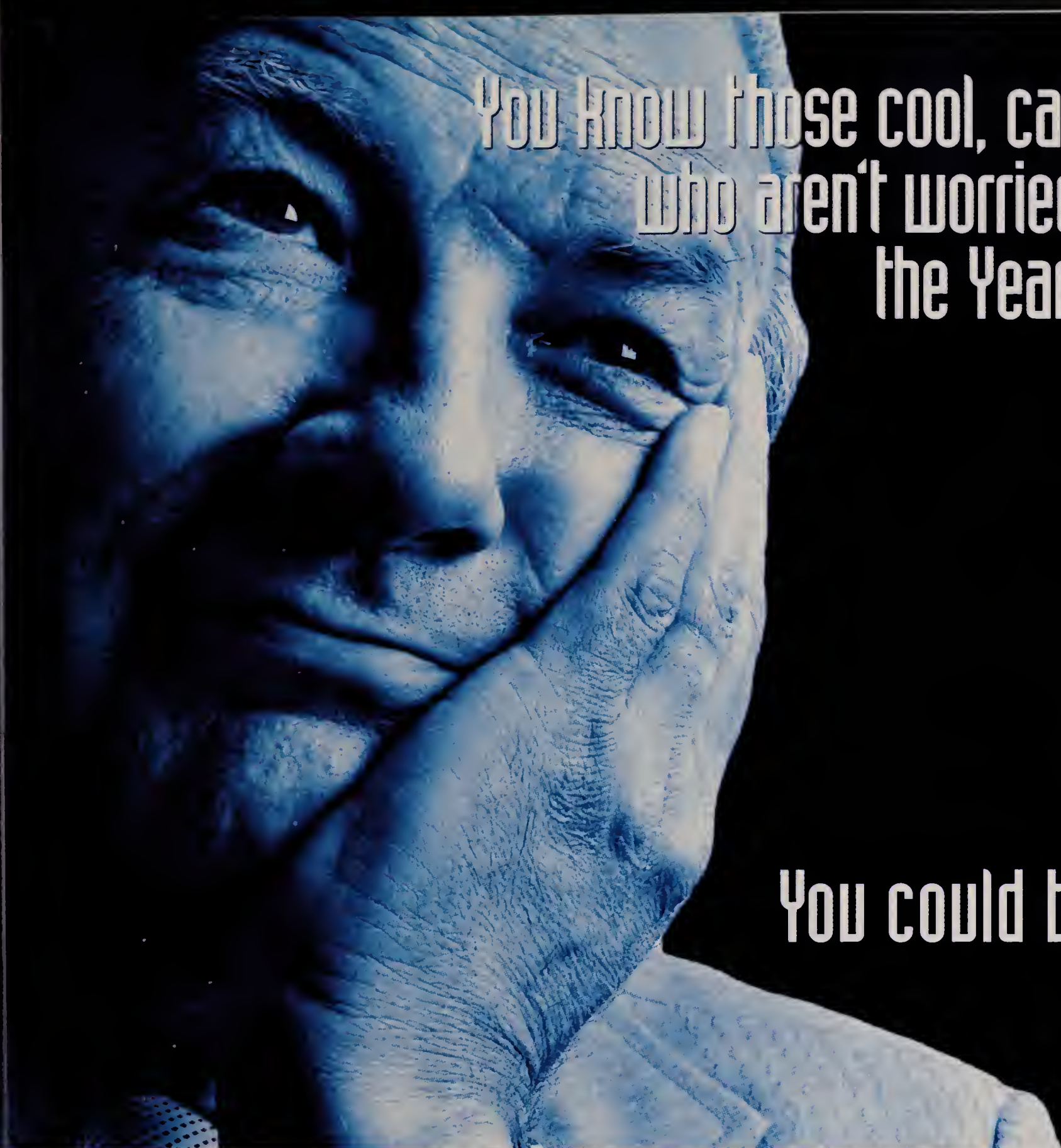
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Emerging Technology

Environment (CAVE), created by the Electronic Visualization Laboratory at the University of Illinois at Chicago. Over the past three years, the school has garnered \$12 million in contracts from companies using CAVE for VR projects.

Each of the four CAVE systems now in operation features three walls, a floor and a 15-foot-high ceiling. The walls and floor are screens that receive images from four video projectors. The images are projected in stereo so that users wearing 3-D glasses find themselves immersed in a virtual world. A synchronized sound system heightens the illusion of reality.

CAVE's images are created on Silicon Graphics Inc. workstations or high-powered PCs running VR software such as Sense8 from Sense8 Corp. of Mill Valley, Calif., and then relayed to a rack-mounted Silicon Graphics Power Onyx Infinite Reality supercomputer that operates the video projection system. A wand allows CAVE users to manipulate projected images, set images in motion or isolate image segments for analysis.

The CAVE platform accommodates up to 12 users, each of whom will experience all of the visual and auditory sensations of "being there." A test pilot, for example, can sit on a folding chair inside the system while projected images offer the sensory experience of being at the controls of a fighter jet. "He can test, fly and crash the jet a hundred times and never be hurt or lose an airplane," says Ron Kriz, associate professor of engineering science and materials science and engineering at Virginia Polytechnic Institute and State University in Blacksburg, Va. The school recently acquired a CAVE system at a cost of \$1.6 million.

Engineers from Caterpillar Inc. use CAVE to design and test new construction equipment, while meteorologists in Illinois use the system to simulate tornadoes and other severe weather events, Kriz says. He notes that medical researchers with access to CAVE can step inside the AIDS virus and see in detail its deadly structure.

Kriz explains that CAVE offers visual

Smile! You're Going Digital

Digital cameras offer flexibility for business users

LOW-COST DIGITAL CAMERAS are arriving on the market at a furious pace, with more than a dozen vendors aggressively vying for market share. Nearly 1 million sub-\$1,000 digital cameras will be shipped to customers in North America this year, according to InfoTrends, a Kansas City, Mo., market research firm. While many of those units will be purchased by home shutterbugs and computer hobbyists, a sizable number will also be snapped up by company managers for a variety of business applications.

Many business users appreciate the flexibility of digital photography, says Stephanie Cudicio, a digital imaging analyst at market researcher Frost & Sullivan in New York.

"Unlike traditional film cameras, digital cameras allow users to immediately incorporate images

simply centers the subject in the viewfinder and presses the shutter-release button. With most models, there's no focus, shutter or f-stop settings to worry about. Inside the camera, a light-sensitive semiconductor called a CCD (charged-coupled device)

DIGITAL CAMERAS

replaces photographic film. Image data is transferred from the CCD to an analog-to-digital converter chip and then to internal memory or a removable PCMCIA card. Most models also come with a cable to transfer images directly to a PC.

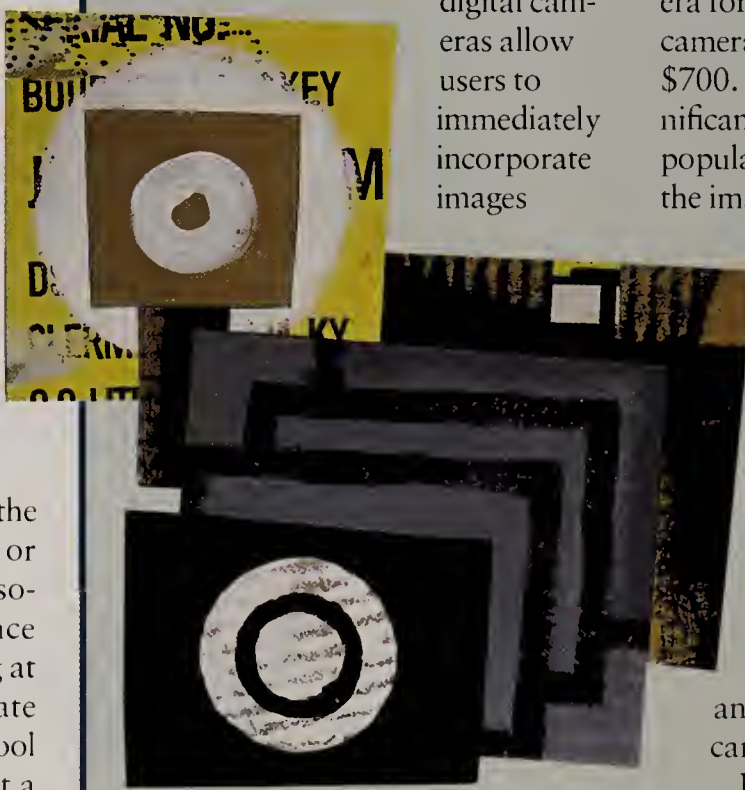
Although digital camera prices are falling rapidly, the products are still far more expensive than their film-based counterparts. While one can pick up a point-and-shoot film camera for about \$50 to \$100, digital cameras typically range from \$200 to \$700. Unfortunately, despite the significant price differential, the most popular digital cameras can't match the image quality of even a cheap film camera.

The problem lies in the pixels. A typical digital camera crams a little more than 300,000 pixels onto a frame—an adequate number to provide a reasonably detailed image but not nearly enough to approach the fine output of even a \$10 disposable film camera. One would need a million or more pixels—

and a far more expensive digital camera—to accomplish that feat.

Fortunately, most business applications don't demand ultra-high-resolution images. "The vast majority of business users value the speed and convenience a digital camera offers over high image quality," says Cudicio. "Their key concern is documenting people and objects for internal use, a Web page or a publication, not creating photographic works of art."

—John Edwards



directly into a wide range of programs," says Cudicio. She notes, for example, that potential applications include adding photos to human resources databases and employee ID badges, documenting assets and illustrating World Wide Web pages.

Digital cameras look and operate like conventional point-and-shoot cameras. To take a picture, the user

some companies start with ready-made parts
that fit together easily.

you start with liquids.

and solids.

and gases.

and fire.

you have to deal with variables you can't even see.

you are a process manufacturer.

hope your software
knows that.



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Emerging Technology

information that can't be delivered by flat computer screens. "And with sight comes insight," he notes. "In CAVE, I can control a complete scene or structure. If I can control a structure, I can design a new property for it."

Desktop Virtual Reality

Whereas full-immersion systems like CAVE meet the needs of organizations with specialized or highly demanding VR projects, desktop VR is gradually gaining acceptance among businesses with more modest needs as well as those that must bring more than a handful of people into a VR exercise. Arthur D. Little's Richardson notes that companies in industries such as automobile and aircraft production are leading the way in the everyday use of desktop VR, where virtual worlds are displayed on conventional workstations. "Those companies have moved beyond CAD and into VR, using the technology not only to create functional representations of how a product or component will work in the real world but to develop a virtual laboratory in which different approaches can be tested and evaluated," he adds.

Desktop VR allows engineers and technical specialists to experiment freely without running up huge costs building clay models and other prototypes, says Frederik Gustafsson, marketing manager for Prosolvias Clarus, a VR software developer based in Gothenburg, Sweden. "Virtual reality also saves time because one doesn't have to wait for prototypes to be physically constructed," he adds.

BMW, a Prosolvias Clarus customer, recently used the company's VR tools to create a VR-based Experimental Vehicle Department, offering all the functionality of a real-world design workshop. The onscreen workshop provided two main work areas: a parts table for storing components and a measuring room where all tests, checks and situations could be processed.

To develop the virtual workshop application, BMW used Silicon Graphics workstations, including the Indy, Indigo2 Extreme and Indigo2 Impact. To deliver the finished application for presentation, the company used an Onyx Reality Engine 2 with 12x 200MHz processors and 768MB of RAM. The software tools used to develop the application included Clarus's CAD Real-Time Link, which transfers CAD data to formats usable in real-time simulation, and Oxygen, the company's development environment.

The automaker's goal was to give its engineers the ability to assemble and test automotive systems without manufacturing any physical mock-ups, Gustafsson says. Various background sounds, including collision detection, gave users the impres-

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Fine Print

WHAT IF YOU COULD PRINT, COLLABORATE, staple and stack your business documents—or fax them to a printer that could—without leaving your desk? Dataproducts Corp., the Simi Valley, Calif., developer of high-performance network and office document printers, has announced such a concept in printing and distributing digital documents. With DDS 24, its digital document server, users can create documents, print original copies and distribute them remotely while they are working at their desks.

Designed to be integrated with most major network operating systems, the DDS 24 creates high-quality finished documents that are printed with copier-like speed and offers various stapling options for local distribution. Or, if the user selects remote distribution from the print window, the DDS 24 can send the document to a remote site via its fax modem. If the recipient is another DDS product, the document can be printed remotely as a 600 dot-per-inch original on any supported paper size. If the recipient is a fax machine, the document is sent as a high-quality T.30 fax.

In addition to increased productivity, companies can reduce paper costs significantly by faxing two-sided pages. All of those services are accessed from a workstation with no waiting in line for the copier or fax machine. And unlike other products that signal job completion when the job has left a network file server, the DDS 24 notifies users of completion when the last page is stacked in the output bin.

The DDS 24 carries four standard input trays and one 2,000-sheet output tray as well as a finisher. It handles statement-, executive-, letter-, legal- and ledger-sized paper. Other standard features include duplexing, multipositional stapling, high-capacity stacking and job separation. An optional envelope feeder is also available, as is support for token ring networks. The product is priced at \$10,500.

For more information, call 805 578-4371 or visit www.dpc.com.

The World is Getting Flatter

FOR MANY, THIN AND LIGHT wall-mountable monitors are a vision from the future—out of reach and unrealistic for the real world. But one company has succeeded in bringing such innovative displays to today's market.

Sceptre Technologies, a manufacturer of notebook computers and CRTs, has available a 15-inch LCD that reduces the amount of desk space required for traditional CRTs and offers flicker-free images that emit almost zero radiation. The company is currently selling into such vertical markets as hospitals, banks and the government,

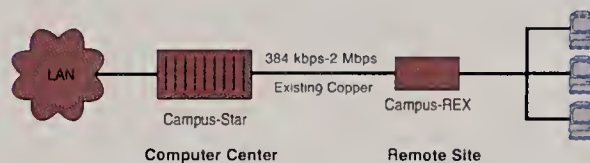


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Emerging Technology

sion of working in a real design facility. Ultimately, the workshop was used to verify the mountability of parts in the door of the new 5-series BMW. "It took approximately 640 work hours to bring the application to the point where they could use it for feedback," notes Gustafsson.

PC Virtual Reality

While the level of VR interactivity increases with the complexity of the system, even a system as modest as a 120MHz Pentium PC is capable of supporting impressive VR applications, Richardson says. "You can't dismiss the PC as a VR platform," he says. "With even low-end PCs beginning to possess the power of workstations, you can now construct sophisticated virtual worlds without spending a lot of money."

Synthonics Technologies Inc., a Westlake Village, Calif., startup, is offering desktop-based VR products that aim to give everyday PC users sophisticated VR modeling capabilities. Rapid Virtual Reality (RVR), Synthonics's proprietary software, helps users create 3-D replicas of objects and backgrounds that can then be integrated into complete VR environments for use in medical, dental, real estate, legal and general business applications.

RVR makes it possible for any PC-literate individual to construct accurate and detailed 3-D images with full walk-around capabilities using ordinary photographs of existing objects and environments, says Charles Palm, Synthonics CTO. Two or more different photographic perspectives of a given object allow the creation of a 3-D frame. Once the frame has been completed, a detailed and textured outer layer can be applied and then smoothed out using a variety of techniques that make it match the original object.

According to Palm, RVR makes it affordable to create high-quality, photorealistic 3-D image models and backgrounds on Pentium PCs. "With RVR, users will be able to complete most of their 3-D rendering projects at a cost savings of 70 percent to 80 percent," he says. The final files are small enough—usually smaller than 1MB—to be sent via e-mail, he adds.

Although RVR's output is presented on a standard computer monitor, users can don inexpensive 3-D glasses for a stereo view. "The glasses only cost about 15 cents per pair, yet they offer a convincing 3-D effect," says Palm. "While VR helmets and goggles are great if you want to show VR on a single system to a single user, they aren't of much use if you want to distribute your presentation to a larger audience."

Palm notes that RVR and similar products have a wide range of potential uses, such as developing walk-through architectural models, creating

LEADING

EDGE

including use in military tanks, where the LCD's space-saving aspect is important and where its low-level radiation won't interfere with other equipment.

At Encyclopaedia Britannica in Chicago, Larry Merrick, vice president of information systems, uses a Sceptre LCD to transform an executive boardroom into a state-of-the-art presentation center. The audience easily can view a monitor that has been built into a podium at the front of the room without straining to see an overhead slide or a computer screen in the middle of the room.

At about two inches thick, the monitor can fit in a briefcase, making it an ideal size for those in the mobile workforce who often hold presentations on the road. The 15-inch monitor costs about \$3,000. For more information, contact Sceptre at 800 788-2878 or www.sceptretech.com.

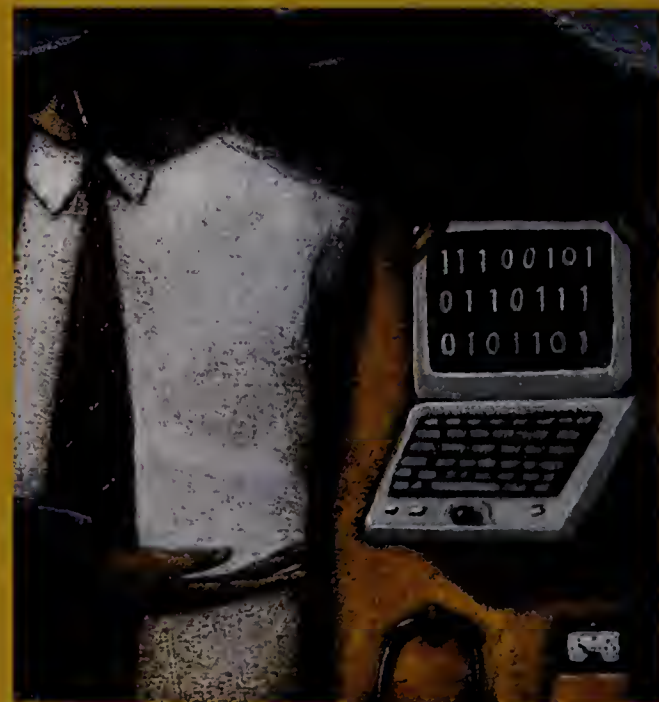
PC Phone Home

IMAGINE LOSING NOT ONLY YOUR VALUABLE notebook computer but all the important data it holds? The FBI reports that 90 percent of stolen computer equipment is never recovered. And theft is rising: Approximately \$1.4 billion in PCs were stolen in 1996, up 28 percent from 1995, according to Safeware, a computer insurer based in Cleveland.

In the face of such climbing theft statistics, one lucky owner was happy to retrieve her notebook PC after it was stolen from her office. How? It was protected with CompuTrace, security software from Vancouver, British Columbia-based Absolute Software Corp. that can be used to protect computers and the valuable data they contain.

Unlike some computer security products that focus on deterring theft, such as locks and encryption software, CompuTrace is the only undetectable software that actually recovers stolen PCs. Here's how: CompuTrace silently calls in to the CompuTrace Monitoring Center on a regular basis. If a computer is stolen, the customer contacts one of the CompuTrace theft recovery officers, who are available around the clock, seven days a week. The recovery officer will trace the stolen computer via the phone network the next time someone uses it to call in (when connected to a phone line), even if the Caller ID is blocked or the number is unlisted. Absolute Software also works directly with law enforcement throughout the theft recovery process.

CompuTrace sells for \$29.95, with an annual monitoring fee of \$60. The product runs on 486-based or higher PCs with any modem. To purchase CompuTrace, call 800 220-0733 or visit www.computrace.com.



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anatomically correct models for medical and dental training, re-creating crime and accident scenes, and developing walk-around product models for electronic catalogs. Other vendors of PC-based VR software tools include Sense8 Corp.; Division Inc. in Cary, N.C.; Superscape Inc. in Palo Alto, Calif.; Virtus Corp. in Cary, N.C.; StrayLight Corp. in Warren, N.J.; and VREAM Inc. in Chicago.

VR on the Net

The fastest-growing and perhaps most important VR venue is the Internet, where an updated version of the Virtual Reality Modeling Language (VRML) has spurred the development of the first Web-based 3-D authoring tools,

world shopping, only more convenient and fun," says Chuck Riegel, Virtus senior vice president of marketing. But Internet VR's promise extends far beyond cyber-retailing, he adds. "The real potential exists when you mix graphics processing off a CD-ROM and positional data is transferred back and forth on the Internet," he says. "With that sort of arrangement, a factory manager could personally take a group of executives from around the world on a tour of his plant, or a travel agent could guide customers through available hotels in a given city."

Another player in Internet VR is NTT Soft in Palo Alto, Calif., a U.S. subsidiary of Japan's Nippon Telegraph and

Participants can also visit a virtual aquarium to see 3-D fish swimming in simulated tanks or board a research vessel to visit virtual whales. A Community Cyber Event Area provides visitors with a place to gather for events and entertainment created especially for Virtual Peninsula.

Internet VR may be the key to a wide range of business activities in the next century, says Tim Takeuchi, an NTT Soft manager. "From retailing to distance learning, businesses and customers are going to be doing great things with VR," he says. "I think VR represents the Internet's future because people won't want to go back to a flat world once they've experienced 3-D."

Although VR is an exciting and seductive field, Riegel says that CIOs and managers need to forget the hype and simply view the technology as another real-world tool. "No organization should adopt VR just because it's there or because it's fun," he says. "You're taking the right approach if you look at your organization's current systems and applications and wonder how they can be helped with the addition of 3-D simulation or virtual world interactivity."

Richardson says VR's potential has yet to be tapped, largely because of resistance from CIOs and managers who refuse to even consider using the technology. "There's no doubt that many organizations have been scared away from VR due to concerns about its perceived high cost and complexity or just because of a built-in bias toward anything that's trendy or experimental," he says. "But given the rapid progress the VR market has made over the past few years, it's time for many decision makers to reconsider their attitude." **CIO**

John Edwards is a freelance technology writer based in Mount Laurel, N.J. Visit his Web page at [//members.aol.com/EdWords/top.html](http://members.aol.com/EdWords/top.html).



"With sight comes insight. In CAVE, I can control a complete scene or structure. And if I can control a structure, I can design a new property for it."

—Ron Kriz

browsers and related products. VRML 2.0, which made its debut in August 1996, was developed in cooperation with Netscape, Microsoft, Sun Microsystems, Silicon Graphics and other major Internet players. The companies hope that a market for online VR training, simulation, data visualization and other technologies will develop quickly when there is a stable platform.

Some software developers are taking advantage of VRML. Virtus, for example, offers several tools for creating 3-D environments on the Web. Using Virtus products, Web merchants can create online shops with walk-around showrooms, product demonstrations and virtual sales clerks.

"VRML has the potential to help make online shopping more like real-

Telephone (NTT). In December 1996, NTT Soft launched a pilot program called Virtual Peninsula for 100 households in Palo Alto. The project links users together through the Internet via Windows PCs and an ISDN or cable modem. Virtual Peninsula participants can explore a simulated world, communicate with each other and experience 3-D models/objects, images and videos.

Various geographic landmarks from Palo Alto and surrounding communities are incorporated into the Virtual Peninsula environment, including downtown Palo Alto, Stanford's Hoover Tower and a Tower Records store in which visitors can engage in electronic commerce by browsing and purchasing CDs and other products.

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FEATURING: Dr. Geoffrey Moore and Nicholas Negroponte

A Tale of Two Webs:

Making Your Intranet and the Internet Pay Off

DORAL GOLF RESORT & SPA ■ MIAMI, FLORIDA ■ MAY 18-21, 1997

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Working Smart

MAXIMIZING THE PAYOFF FROM I.T. Edited by Megan Santosus

FEW BUSINESSES had to contend with the situation once faced by Pride Enterprises, a St. Petersburg, Fla.-based company charged with managing the state's prison industries. Before Pride became private recently, the company was required legally to sell its products—as wide ranging as furniture and printing services—to tax-supported government entities only. Despite the restrictions on its markets, Pride did face at least one challenge familiar to most companies. With 45 business units responsible for manufacturing more than 3,000 products, Pride had to keep tabs on its manufacturing and financial processes. Thanks to a computer integrated manufacturing (CIM) system that centralizes processing, Pride has saved hundreds of thousands of dollars.

In 1985, when Kevin Monaghan became CIO of Pride, the company ran all of the bookkeeping for its business units on a single Digital Equipment Corp. PDP-11/44. The business units produced operating documents on-site and mailed them to Pride's central office. There, three or four people keyed the report data into the DEC machine so that Pride's management could process the payroll, general ledger and inventory information for each unit.

But as the company grew—from \$35 million in 1985 to \$75 million in 1990—the process became increasingly clumsy. Some business unit managers had bought PCs to create their own spreadsheets, while others used Pride's machines to process job costing, purchasing and inventory at a local level. Employees were entering data and making calculations twice because of the different computer systems

Pride Enterprises' CIM System

in the various locations and central office. As a result, says Monaghan, Pride's financial information was inconsistent, incorrect and out of control.

Not only was the information difficult to access, but the system started to hinder Pride's business. Because the computers of each business unit were unique, communication among the units was shaky. If, for example, one client ordered shirts from one location and

the-shelf CIM system from Potomac Business Solutions of Richmond, Va. The system was finally in place companywide by June 1995.

The system connects more than 400 users via dedicated lines and handles the company's order entry, purchasing, job costing, accounts receivable, general ledger, inmate payroll, report writing and e-mail. Housed on a Unisys A11-611 mainframe and running on Unisys's DMS II database, CPA is accessible to employees from PCs and workstations.

So far, the biggest benefits have stemmed from centralized order management. "Before, each industry went out and sold its own products. [Pam Davis] wanted to change that," Monaghan says. "She wanted to make it easy for the customer to do business with us."

With the CIM system in place, customers are now able to place a single order, which the system parses and routes to the appropriate business units. That has decreased order lead times and increased customer satisfaction, Monaghan says. In fact, by consolidating the order process, Pride has settled on a single part number for each inventory item, enabling the company to consolidate its orders to suppliers and take advantage of bulk rates.

There are other benefits as well. Instituting CPA has helped Pride consolidate its 45 original general ledgers into one and close its monthly books in five days rather than three weeks. Since 1993, Pride has spent about \$440,000 each year to buy, develop, implement and support CPA. In 1995, Pride calculated a 130 percent return on investment; last year, ROI topped 150 percent, Monaghan says. —Heath Row

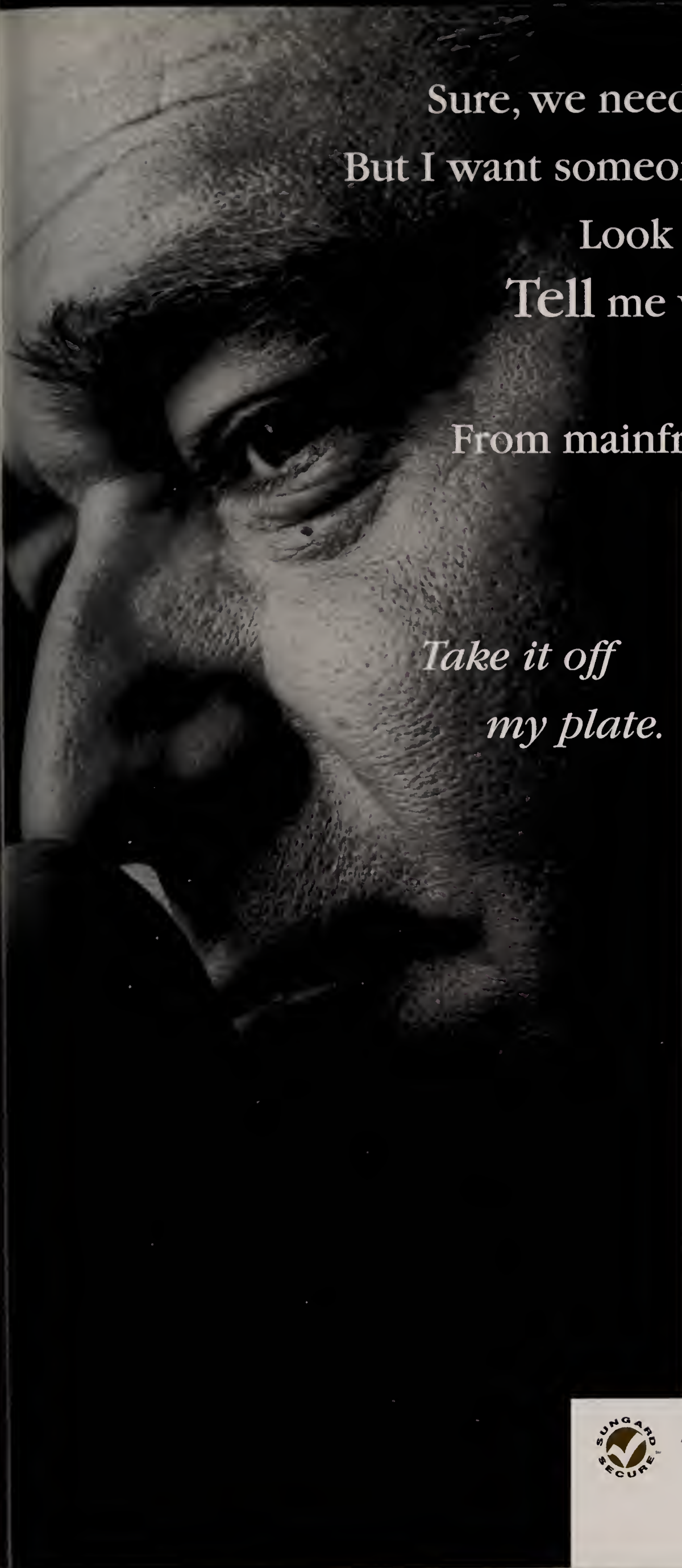
Vital Statistics:

- **Organization:** Pride Enterprises, St. Petersburg, Fla.
- **Application:** Computer integrated manufacturing system
- **Technologies:** The Potomac Business Solutions Inc. CPA application sits on a Unisys Corp. A11-611 mainframe and uses Unisys's DMS II database; currently, CIM connects 45 business units via dedicated lines
- **Sponsor:** Pam Davis, CEO; Kevin Monaghan, CIO; David Glaser, CFO
- **Scope:** 400 employees use CPA to manage the account activity of 4,000 customers
- **Objective:** To make real-time financial data available to management; improve materials management and customer service; make accurate customer order and sales data available to sales and marketing staff
- **Payoff:** Through 1997, Pride expects a 60 percent total cumulative ROI on its \$2 million expenditure

pants from another, there was no way for the business units to know, says Scott Davis, Pride's applications services manager. As a result, customers had to place separate orders with each manufacturing operation.

In 1990, with the arrival of CEO Pam Davis, Pride decided to centralize its financial and manufacturing data processing systems. After a lengthy RFP process, Pride chose CPA, a modified off-

Send Working Smart ideas to Associate Editor Megan Santosus at santosus@cio.com.



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So you've been craving a switch that's both cost-conscious and supports your bandwidth-hungry end users? Introducing Cabletron's new line of Ethernet SmartSwitches specially designed for the wiring closet/workgroup market.

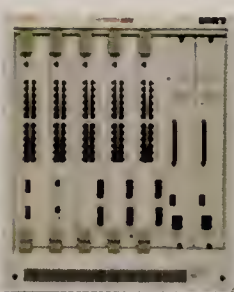
Each switch provides true plug-and-play capability for quick and easy set-up. Then you can expect the fast, reliable performance of an award-winning* switch family. Key features include Layer 3 switching with broadcast control and embedded per-port RMON. SecureFast™ advanced management applications allow for point-and-click adds, moves and changes, as well as enhanced security. You'll enjoy not only a lower cost-per-port (in many cases, lower than today's shared-access solutions), but reduced operating expenses over the long haul.

Choose the switch that fits. For big appetites, the SmartSwitch 6000 is a new 5-slot modular solution with distributed switching, fault tolerance and redundant power. A fully loaded SmartSwitch 6000 can provide switched Ethernet for up to 120 users with Fast Ethernet, FDDI and ATM connectivity.

On the lighter side, the SmartSwitch 2000 family of workgroup/desktop switches offers the same functionality as the 6000 in a standalone model. The new SmartSwitch 2200 is the first in this line and features 24 ports, two Fast Ethernet ports and a high-speed uplink for FDDI or ATM.

High-end features. Affordable price. Doesn't get much simpler. Take an early lunch break and call 603-337-0930 or visit us on the Web at www.cabletron.com.

SmartSwitch 6000



SmartSwitch 2200



*SmartSwitches named Editor's Choice in *Network Computing* magazine (1/15/97)

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shows, smaller conferences give attendees more value. "It's great to get the CIO and the webmaster together in one room collaborating and working as a team," says Walt Hadzinsky, vice president of IS for Armor All Products Corp.

Pairing Up

Technology suppliers and customers are also more likely to pair up at smaller conferences — and customers say that kind of one-to-one exposure gets suppliers on their short lists.

A relationship is much more likely to spark "if we can meet [a supplier] in a casual setting and find out if there's a chemistry," says Charlie Wilson, vice president for client strategies at Vallon/Culture Shock.

That fact turns out to be one of the greatest benefits to corporate sponsors. Prequalified attendees and focused content give sponsors' marketing efforts a big boost. "Because the quality [of attendees] is so much higher, each conversation tends to turn into a very qualified lead," says Celine

Schmidek, director of marketing programs for Connect, Inc., a sponsor of the *WebMaster Perspectives* conference. "We've talked to high-quality attendees from our targeted industries that we might otherwise have had difficulty penetrating."

In these budget-conscious times, smaller conference programs deliver more bang for suppliers' bucks. Says Vicky Carman, marketing communications manager of Intel and sponsor of the *CIO Perspectives Conference*, "The great thing about CIO's conferences is having face-to-face contact with a number of very qualified prospects."

Katie Finneran, media and events manager of Lockheed Martin, another *CIO Perspectives* sponsor, concurs. "This is still the best conference available to the executive IT market." ✱



CIOs TALK ABOUT...

...Mastering the Web for Business

The CIO WRAPSHEET asked several IT executives who read WebMaster about their biggest "Web" challenges and how they get involved in the purchasing process:

Q *To what extent are you involved in Web-related decision making and what challenges do you face?*

A The Web strategy was actually my initiative — I went out there and found the champions in the business units. Right now it's my foremost priority. I am involved in every phase of the purchase decision-making process and strategy development decisions. I oversee every user group and every focus group. I know that the Web is going to make our organization, our firm, successful.

Suzanne Krupa
CIO
KPMG

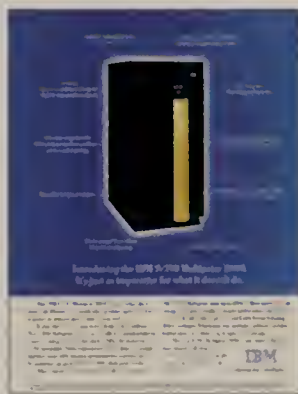
A As the top decision maker for all vendor selection and IT purchases, I must continuously challenge my staff to provide world-class systems that are on the leading edge of technology. One of my greatest challenges has been developing a corporate intranet that will enable information sharing between employees, vendors and licensees around the world. The size of the company combined with the nature of the ever-changing fashion industry has made the need for effective up-to-the-minute communication a top priority at Guess.

Joseph Fink
Vice President and CIO
Guess Company

A Every day we think of new ideas, new things that we'll do on the Web. So, as we approached the budget for this year, we built in a flexible amount of money allocated toward the Web. It was the IS organization that came up with the idea of making the catalog and order status available on the Web. We hooked our commerce Web to our data warehouse. Now that's typically IT people that think of those types of capabilities. We begin the buying process by weighing the cost vs. benefit. In the end, I'm responsible for putting together the technologies that will make these Internet features available to our customers.

Jack Dowling
CIO
CompuCom, Inc. ✱

Congratulations to the Top 5 WebMaster Harvey Study Winners



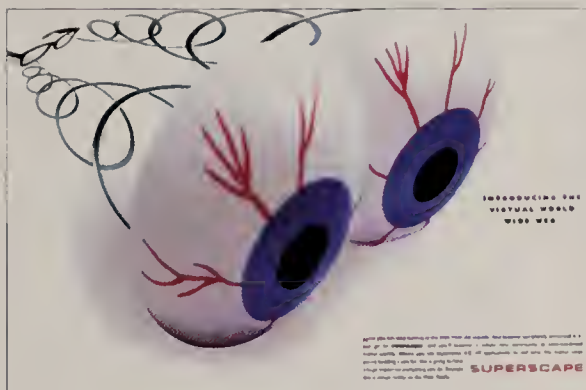
1) IBM Corp.
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2) Lotus Development Corp.
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5) APC-American
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WebMaster

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All full-run, one page or larger advertisers get a comprehensive report on the effectiveness of their advertisement, as well as verbatim comments from readers. *For more information, please contact Mike Masters at (201) 244-5510 or masters@cio.com.*

CIO to Celebrate 10 Year Anniversary

What's NEW@

CIO Communications, Inc.

Hold onto those opportunistic advertising funds! The September 15, 1997 issue of *CIO* will celebrate the publication's tenth anniversary by examining the role of technology in business from both a historical and futuristic perspective. It will profile leaders of the information age in a major editorial feature and spotlight the most influential CIOs, gurus, business ideas and IT solutions in another feature called: "The Hall of Fame." This issue presents a unique marketing opportunity to advertisers, since readers will be repeatedly referring to this special edition for months to come. For more information, contact your local *CIO* sales representative. ✕

Watson Joins CIO as PR Director

CIO Communications has hired Susan Watson as public relations director to further increase the company's visibility in the marketplace. To



accomplish this, Watson will develop and implement a comprehensive PR program to promote and publicize *CIO* and *WebMaster* and the company's Executive Programs.

Prior to CIO, Watson was marketing director with *Boston Magazine*, where she was responsible for promotion, publicity, research and special events. Before joining *Boston Magazine*, she was special projects director for Wenner Media, where she developed PR campaigns for *Rolling Stone*, *Us*, and *Men's Journal*. ✕

CIO Media ClubHouse Debuts

CIO's Media ClubHouse (www.cio.com/marketing) is now receiving a mega facelift. It will be continually updated to provide IT marketers with valuable information. *CIO WRAPSHEET* readers may want to visit so they can subscribe to "Media ClubHouse News," an annotated version of this newsletter, which is sent via email on a quarterly basis. In addition, visitors

can participate in such recent MarketTalk online forums as Web advertising, high-tech branding and driving prospects to your Web site. Bookmark it. ✕

Fifth Annual Enterprise Value Retreat: A Roaring Success

The fifth annual *CIO Enterprise Value Retreat* got rave reviews from the approximately 300 attendees and corporate sponsors. The latter networked with attendees from some of the largest organizations in the world.

The average participant was from a company with annual revenues of \$5.1 billion. The average attendee's corporate IT budget was \$49.2 million.

CIO's next *Enterprise Value Retreat* is February 1-4, 1998 at the Ritz-Carlton Laguna Niguel in Dana Point, CA. Reserve your space now as a Retreat corporate host. For more information, contact your regional sales representative or Lynda Rosenthal at (508) 935-4273. ✕

CIO Editorial Calendar

June 15	May 7
E-Commerce Update	
July	May 22
Update on the Federal CIOs	
Aug	June 24
The 10th Annual CIO-100	
Sept 1	Aug 6
Managing through a Merger	

WebMaster Editorial Calendar

June	May 12
Field Report: Data Mining	
July	June 11
Special Issue: Web Infrastructure	
Aug	July 15
Special Issue: The WebMaster Awards	
Sept	Aug 11
Schooling on the Internet	



CIO Communications, Inc.

The CIO WRAPSHEET

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The CIO WRAPSHEET

YOUR GUIDE ON MARKETING TO INFORMATION EXECUTIVES

SPRING 1997

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VOLUME 4, No. 2



Sound Bites

Cabletron Systems' partnership with CIO Communications is essential to the success of its marketing plan, which focuses on reaching and educating executive level IT decision-makers who control the direction, purchasing and long-range strategic plans of their enterprises.

Cabletron leverages its IT expertise to provide building blocks for creating a faster, more cost-effective and easier-to-use enterprise. Advertising in *CIO* and participating in the *CIO Enterprise Value Retreat*, *CIO and WebMaster Perspectives* conferences lets us deliver this message to a high-level audience.

We partner with CIO through a variety of media. As a print advertiser, we reach thousands of senior management readers; the conference sponsorships grant us reciprocal communication with our customers and prospects, enabling us to speak on an informal basis and better understand their individual needs and concerns.

Shellie Rapson James
Manager of Corporate Programs
Cabletron Systems, Inc.

FOCUSED CONFERENCES OR MEGA TRADE SHOWS?

Where Are Marketing Dollars Better Spent?

Follow the trail of senior IT executives. They're flocking to small conferences to find technology solutions, explore new trends and network with peers; that just can't be done among the miles of aisles at megashows.

For starters, IT executives at smaller conferences are actively searching for solutions to daunting technical implementations like Internet/intranet applications. There's a genuine sharing of insight on business solutions and a work ethic that's absent from large trade shows.



CIO Communications is addressing the market need for focused programs with its

IN THIS ISSUE

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CIOs Talk About Mastering the Web for Business	3
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Perspectives series and the *Enterprise Value Retreat*.

"A lot of trade shows and conference invitations cross my desk so I need to be very selective about time spent away from the office," says Sue Kozik, vice-president, Cigna Technology Services.

"The *Enterprise Value Retreat* lets me interact with a group of my peers who are dealing with the same challenges I am. I also continue to exchange problem-solving methods and experiences with fellow attendees after the Retreat is over."

Looking for IS Solidarity

Among the hot IS projects at NCR Corp. is opening relational data to employees using a Web interface.

Program Manager Denise Holz attended a *WebMaster Perspectives Conference* looking for the IS solidarity that's lost when the number of conference-goers swells to 100,000-plus. What she needed — and got — from the program was re-assurance, she says, "that the challenges and problems we have are common." By substituting that kind of real-world problem-solving for the glitz and glare of large downtown

CONTINUED ON PAGE 3



CIO Communications, Inc.

How to Evaluate Conference Sponsorships —

At the best conferences, corporate sponsors earn all-important face time with key technology influencers and drum up new sales. At the worst, sponsorships become expensive boondoggles at which the liveliest debate among guests is whether to squeeze in another 18 holes of golf.

Sorting the good from the bad in the crowded conference industry means asking conference organizers pointed questions, says Bill Laberis, former editor-in-chief of Computerworld and current president of Bill Laberis Associates, a Holliston, MA-based marketing consultancy.

To find the events that deliver the most return on investment rather than the best suntan, Laberis suggests the following tips:

1. Evaluate the event on its content — not on the plushness of its location or on keynote speakers. A longtime surveyor of the conference scene, Laberis believes that lavish venues and party-crammed agendas often distract attendees from doing business. While a relaxed environment is important, content is king. Start your conference assessment with a review of the preliminary roster of events. If you've heard many of the speakers at other conferences, says Laberis, "that's a signal this isn't a serious conference."

2. Look closely at the content of the work sessions. The best conferences help their sponsors build reputations as solution providers, not party hosts, advises Laberis. To ensure your sponsorship produces bottom-line results, skip shows that offer working sessions with vague titles like "How IT is Remaking the Corporation." Focus instead on those "that reflect the high-pressured and often unforgiving nature of IT," he says.

3. Look for conferences that tackle real-world issues like integrating the Internet into business processes, or the political and economic issues of building corporate intranets. A good rule of thumb is if it sounds like a pop-business book title, stay away. ✕

According to Lynda Rosenthal, senior vice president and general manager of CIO's Executive Programs, "Our Executive Programs provide a venue that allows our sponsors and attendees to develop intimate relationships without the distractions at larger events. This enables real-world, real-time problem solving and the chance for attendees to discuss their experiences with each other during and after the conference."

Q & A WITH LISA BROWN

Cindy Crow is vice president, Media Services, for Shafer Advertising. She's also chairperson of ITMAC's New Media Committee (Information Technology Media Advisory Council). We recently asked her about ITMAC's latest endeavor to create standards and best practices for online advertising.

Brown What is the mission of ITMAC and whose interests does it represent?

Crow ITMAC is a group of senior high-tech media professionals who act as a representative body for the IT media industry and serve as a resource for this community by promoting communication and information exchange. ITMAC is creating standards of research and reporting for interactive advertising.

Brown What major challenges do online advertising professionals face?

Crow Unlike other media, there are very few standard media terms or definitions for Web advertising. Auditors, publishers and Web site "counters" all report data in different ways, making Web site comparison virtually impossible. Also, banners have no production standards, presenting a nightmare for agencies, which are forced to create several executions of the same creative for each site.

Brown How is ITMAC approaching these challenges?

Crow Over the last two years, ITMAC has developed Web advertising guidelines, which it is now working to implement across the new media industry. These include general banner positioning, media measurement and auditing standards, which are helping to alleviate some of the confusion as the industry continues to grow. ITMAC is working with CASIE [Coalition for Advertising Supported Information and Entertainment], which has also released a set of guidelines [see www.commercepark.com/AAAA/casie/index.html]. ITMAC is continually working to evolve these initial tools and measures to accommodate the Web as the buyers' medium.

Brown What is the role of online publishers in this?

Crow Publishers should review the ITMAC and CASIE guidelines and cooperate with advertisers and agencies by adopting these recommended standards. Online publishers will ultimately benefit by making it easier for media planners to plan and buy advertising on their sites.

Readers should visit the Media ClubHouse at <http://www.cio.com/marketing> for a full text article on ITMAC Web Advertising Guidelines. ✕